The Dynamics of Workplace Conflicts: The Unfolding of Task Conflicts and Possibilities to Counteract Their Negative Effects

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Abstract

Workplace conflicts have been widely recognized as a core social stressor across occupations. Yet, the typical detrimental effects of task conflicts on employee outcomes, such as well-being and performance, have not been confirmed consistently. Further, the fine-grained mechanisms that explain the effects of task conflicts on employee outcomes have not been fully explored yet. This may be because most previous research relied on retrospective self-reports and the complex nature of task conflicts and their multiple emotional and cognitive consequences are difficult to disentangle in cross-sectional field studies. The *first aim* of my thesis was to examine the short-term effects of task conflicts by measuring conflicts using a diary approach with event-sampling methodology in the field (Study 1) and by inducing conflicts under controlled circumstances in the laboratory (Study 2). Across both studies we could find that the effects of task conflicts vary as a function of co-occurring relationship conflicts (i.e., of situational characteristics). Relationship conflicts during task conflicts transform pleasant and effective task conflicts into unpleasant and ineffective mixed conflicts. Specifically, in contrast to task conflicts, mixed conflicts were evaluated more negatively and led to more maladaptive consequences.

The *second aim* of my thesis was to identify participant characteristics that influence the conflict evaluation in addition to the characteristics of the situation. Study 3 explored the effects of emotional mimicry (i.e., the imitation of emotions of others) on the evaluation of task and mixed conflicts. Congruent with our expectations, we found that mimicry helped to explain conflict-evaluation processes over and above the characteristics of the situation during which the task conflict took place. During task conflicts, conflicts were evaluated more positively with increasing levels of mimicry, and during mixed conflicts, conflicts were evaluated more negatively with increasing levels of mimicry.

Finally, the *third aim* of my thesis was to seek for strategies that help to buffer the negative effects of mixed conflicts. Hence, in Study 4, we explored and found support for the effectiveness of a conflict re-evaluation (i.e., reappraisal) intervention on several (objective) indices of negative affect for individuals familiar with this strategy, but not for those unfamiliar with this strategy.

Insights gained from these four studies give a more precise picture of the nature of workplace conflicts and of the modifiability of their consequences, as we 1) investigated the underlying situational characteristics that help to explain when and why conflicts have negative consequences and 2) identified an individual difference that has an important impact on way conflicts are evaluated and 3) describe a strategy that effectively buffered conflicts' negative consequences.

Zusammenfassung

Konflikte am Arbeitsplatz gehören über alle Berufsfelder hinweg zu den am häufigsten genannten Stressoren. Dennoch sind die Befunde zum Einfluss von Aufgabenkonflikten auf das Wohlbefinden und die Leistungsfähigkeit Beschäftigter bisher inkonsistent. Zudem wurden die Mechanismen, die erklären könnten *wann* und *warum* Aufgabenkonflikte negative Folgen haben, bisher wenig untersucht. Ursache hierfür kann sein, dass die komplexen Wirkungsweisen von Konflikten mit ihren multiplen Konsequenzen in retrospektiven Feldstudien nur schwer zu erfassen sind. Das *erste Ziel* meines Vorhabens war es demnach, Aufgabenkonflikte im Feld mittels Tagebuchstudie mit *event-sampling* Ansatz (Studie 1) und im Labor in einem kontrollierten Setting (Studie 2) zu untersuchen, um deren unmittelbare kognitive und emotionale Effekte zu erfassen. Gemäß unserer Annahmen zeigten beide Studien konsistent, dass die Effekte von Aufgabenkonflikten vom gleichzeitigen Auftreten eines Beziehungskonflikts abhängen. Treten Beziehungskonflikte im Kontext von Aufgabenkonflikten auf (im Folgenden „Mischkonflikte“ genannt), dann werden Aufgabenkonflikte negativer beurteilt und gehen mit unvorteilhafteren Folgen einher.

Mein *zweites Ziel* war es, persönliche Charakteristiken zu untersuchen, welche die Beurteilung des Aufgabenkonflikts über situationsbedingte Faktoren (wie der An- bzw. Abwesenheit von Beziehungskonflikten) hinaus beeinflussen. Die dritte Studie explorierte die Effekte emotionaler Mimikry (d.h. der Nachahmung von Emotionen anderer) auf die Beurteilung von Aufgabenkonflikten. Im Einklang mit unseren Erwartungen bestätigten die Ergebnisse von Studie 3, dass Mimikry sowohl die Evaluation eines reinen Aufgaben- sowie eines Mischkonflikts beeinflusst. Reine Aufgabenkonflikte werden positiver, Mischkonflikte hingegen negativer beurteilt je mehr Mimikry während des Konflikts stattfand.

Als *drittes Ziel* galt die Identifikation von Mechanismen, welche die negativen Folgen von Mischkonflikten abschwächen können. Dafür wurde in Studie 4 untersucht, inwiefern kognitive Interventionen zur Modifikation der Konfliktbewertung stresspuffernd wirken. Unseren Erwartungen entsprechend bestätigte sich die Wirksamkeit einer Konflikt-Umbewertungs-Intervention–allerdings nur für Personen, die die Strategie der kognitiven Umbewertung kennen und in ihrem tagtäglichen Leben nutzen.

Diese vier Studien meiner Dissertationsschrift vermitteln eine präzisere Vorstellung der von Konflikten ausgehenden komplexen Wirkungsweisen und zeigen Möglichkeiten der Modifikation von Konfliktkonsequenzen auf, indem 1) zugrundeliegende situationsbedingte Mechanismen untersucht wurden, die helfen zu erklären wann und warum Aufgabenkonflikte negative Konsequenzen haben, 2) der Einfluss individueller Unterschiede in der Konfliktverarbeitung für die Konfliktbewertung beleuchtet wurde und 3) ein möglicher Ansatzpunkt für Interventionen zur Konfliktbewältigung ermittelt wurde.

List of Original Manuscripts

MANUSCRIPT 1. “Measuring task conflicts as they occur: A real-time assessment of task conflicts and their immediate affective, cognitive and social consequences” by Heidi Mauersberger, Ursula Hess and Annekatrin Hoppe (Manuscript accepted for publication at the Journal of Business and Psychology)

MANUSCRIPT 2. “When smiling back helps and scowling back hurts: Individual differences in emotional mimicry are associated with self-reported interaction quality during conflict interactions” by Heidi Mauersberger and Ursula Hess (Manuscript published in Motivation and Emotion)

MANUSCRIPT 3. “Only reappraisers profit from reappraisal instructions: Effects of instructed and habitual reappraisal on stress responses during interpersonal conflicts” by Heidi Mauersberger, Annekatrin Hoppe, Gudrun Brockmann and Ursula Hess (Manuscript published in Psychophysiology)

Preface

Workplace conflicts are ubiquitous challenges in daily work interactions. In general, conflicts are believed to be harmful, not only to the employees who experience them but also to the organization as a whole (de Wit, Greer, & Jehn, 2012; Spector & Bruk-Lee, 2008). However, not all types of conflicts seem to have the same harmful effects. In fact, conflicts can sometimes be energizing and beneficial for organizational productivity (Bradley, Anderson, Baur, & Klotz, 2015). In the literature, workplace conflicts are divided into relationship conflicts (i.e., interpersonal incompatibilities) and task conflicts (i.e., task-related disagreements; Jehn, 1995; Jehn & Bendersky, 2003). Whereas the former reduce well-being and productivity, the latter may be fruitful for task completion (Bradley et al., 2015; DeChurch, Mesmer-Magnus, & Doty, 2013).

Unfortunately, however, this simple black-and-white differentiation between the "bad" relationship conflicts and the "good" task conflicts does not hold in most everyday life situations. Interactions are complex, and what starts out as a small task-related dispute may quickly escalate into name-calling or an ignorant and stubborn persistence on own beliefs and opinions. In turn, the beneficial effects of task conflicts may be overshadowed by the detrimental effects of relationship conflicts. Indeed, recent reviews and meta-analyses confirm that task conflicts typically have negative outcomes (Bradley et al., 2015; de Wit et al., 2012; Loughry & Amason, 2014; O'Neill, Allen, & Hastings, 2013), most likely because task conflicts often occur in the context of relationship conflicts. Yet, research that examined the distinct effects of task conflicts that occur on their own (that is, without the destructive relationship conflicts) is scarce.

This dissertation has the aim to shed light on the differential effects of *pure* task conflicts (in the following called "task conflicts") and task conflicts that occur in the context of relationship conflicts (in the following called "mixed conflicts"). For this, in a first step, it examines the effect of the conflict situation for the conflict evaluation: Why are mixed conflicts appraised differently than task conflicts? Furthermore, it investigates whether conflict evaluations predict proximal and distal conflict outcomes. In a second step, this dissertation explores the relevance of personal characteristics for conflict evaluations: What role do individual differences play in the differential appraisal of mixed conflicts and task conflicts? In a final third step, this dissertation investigates the effectiveness (in terms of the improvement of proximal conflict outcomes) of an intervention that is comprised of instructing individuals to reflect on (i.e., to re-evaluate) the conflict situation: Does cognitive

reappraisal buffer negative affective conflict consequences when taking into account individual differences in the use of reappraisal?

In the following sections, I will provide a more detailed overview of my research framework. First, I will review the research on task conflicts versus mixed conflicts and describe why *intuitive* evaluation processes can explain the differential outcomes of task conflicts and mixed conflicts. Specifically, task conflicts better satisfy the basic human need for achievement than mixed conflicts (see below). Hence, they are appraised as more goal-congruent than mixed conflicts, which, in turn, reduces negative affect and increases positive affect, thus improving (intra- and interpersonal) performance outcomes. Then, I will broaden the perspective to consider prerequisites and show that including personal characteristics in addition to situational demands can help to explain more precisely how the conflict is evaluated: The appraisal of the conflict situation should not only depend on the presence or absence of relationship conflicts (that is, on the emotional tone of the conflict interaction) as such but also on *how* individuals (automatically) respond to the emotional signals they observe during a conflict interaction. In this section, I will focus on automatic emotional mimicry (see below). Finally, I will take a look at more *reflective* evaluation (i.e., re-evaluation) processes that may buffer negative proximal conflict outcomes. In this last section, I will explain the merits and downfalls of cognitive reappraisal as an antecedent-focused emotion regulation strategy taking into account that individuals differ with regard to their familiarity in the use of reappraisal (see below). Figure 1 displays the framework for my research questions.

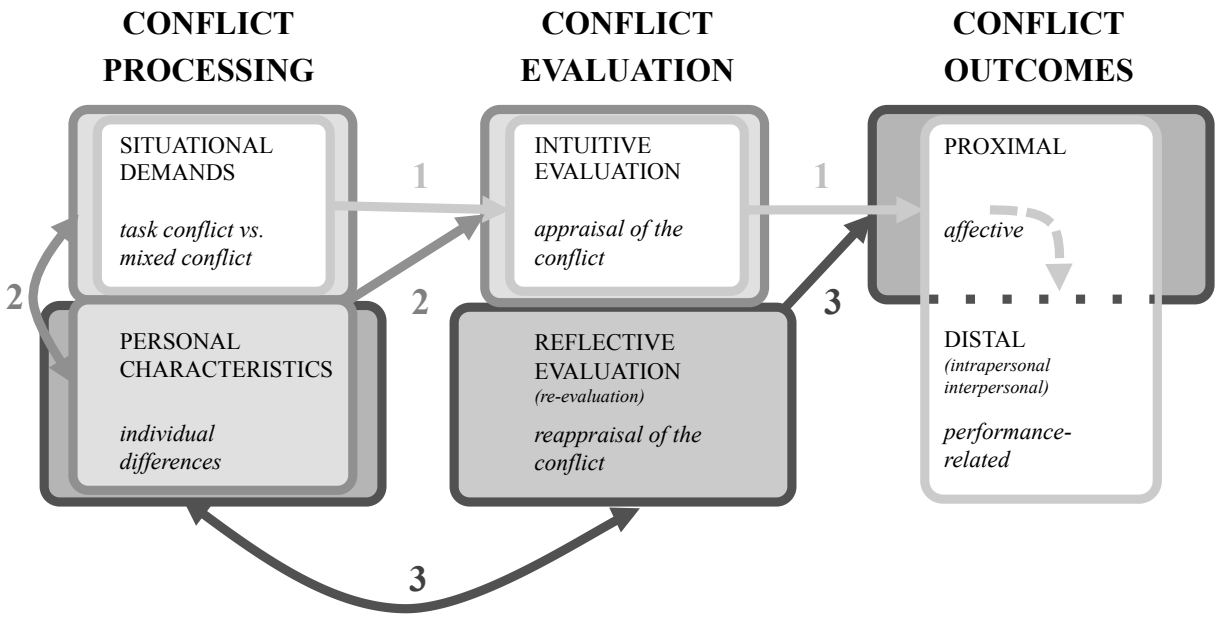

Figure 1. The "Conflict Episode Model"–A framework for the research questions.

Deducted from this framework, I will then present my hypotheses 1) about the relationships between situational demands (task conflicts versus mixed conflicts), the intuitive evaluation (appraisal) of the conflict and proximal (affective) as well as distal (performance-related) conflict outcomes (see Figure 1, path 1), 2) about the combined effects of the situational demands (task conflicts versus mixed conflicts) and individual differences in the processing of these demands on intuitive conflict evaluations (appraisals) (see Figure 1, path 2), 3) about the combined effects of more reflective conflict evaluation (reappraisal) instructions and individual differences in the ability to effectively use these instructions on proximal (affective) conflict outcomes (see Figure 1, path 3). The empirical part of this dissertation summarizes four studies reported in three manuscripts, which investigated these hypotheses. Based on an integration of the results, I will discuss theoretical, methodological, and practical implications as a final part of this dissertation.

The Differential Outcomes of Task Conflicts and Mixed Conflicts

Why do task conflicts energize and improve decision-making whereas mixed conflicts deplete energy and impair information processing and performance outcomes? Although seemingly simple, this question has not yet been answered satisfactorily. In the following I will present the proposed "basic" Conflict Episode Model that consists of three different modules: the role of situational demands in conflict processing, the intuitive evaluation of the conflict, and proximal and distal conflict outcomes (see Figure 1).

The Role of Situational Demands in Conflict Processing

The first component in this model encompasses the *situational* demands. Here I contrast task conflicts with mixed conflicts. Task conflicts are task-related disagreements that occur in a positive, benign atmosphere. Hence, opinions are questioned in a constructive and generous way. Individuals feel invited to share information and are open to include others' information into own considerations (de Wit, Jehn, & Scheepers, 2013). In contrast, during mixed conflicts, information processing is impeded (de Wit et al., 2013). Personal attacks, insults, dismissive attitudes–that is, the very behaviors that differentiate mixed conflicts from task conflicts–create a non-affiliative affective tone (Jehn, 1995). This non-affiliative affective tone detracts individuals from adequately processing information about the task, as one is completely absorbed by thoughts about the unfair treatment one has experienced (e.g., Vytal, Cornwell, Letkiewicz, Arkin, & Grillon, 2013). And, to exacerbate the situation, these behaviors make one feel incompetent in front of others (Chen & Ayoko, 2012).

Intuitive Conflict Evaluation

Almost immediately after perceiving a situation, this situation is evaluated in terms of *goal* relevance and congruence (e.g., Lazarus, 1991). This process takes place instantly and without consuming large amounts of resources (sometimes it is even proposed to operate without awareness; e.g., Lazarus, 1968; see also Lazarus, 1991); hence I refer to it as a *intuitive* evaluation process.

One prominent universal human goal that plays a major role in workplace contexts, and thus represents a highly relevant goal for all employees is the *achievement* goal (also called the "need for competence"; e.g., Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). Individuals strive for competence on an intra- and interpersonal level (Nicholls, 1984). That is, they want to improve own *knowledge* and be better than they were in the past (intraindividual comparison). Further, they want to feel *respected*–which occurs when they are particular, special, superb, better than their peers (interindividual comparison). Task

conflicts may both satisfy and obstruct the achievement goal. On the one hand, own ideas are questioned, implying that one is not as good as others (because if this were the case, others would not dare to challenge own ideas; e.g., De Dreu & van Knippenberg, 2005; Tjosvold, 1991). Hence, it lowers the perceived respect in the eyes of others (interindividual component of the achievement goal). On the other hand, when information provided by others is successfully processed individuals have learned something (e.g., Amason, 1996; de Wit et al., 2013; Pelled, Eisenhardt, & Xin, 1999). This enables personal growth and knowledge gain (intraindividual component of the achievement goal).

If, however, a relationship conflict evolves during a task conflict (turning task conflicts into mixed conflicts), the use of information from others is impeded and hence knowledge gain (intraindividual component of the achievement goal) is inhibited (de Wit et al., 2013). Moreover, not only own ideas but the whole person *as such* is questioned, which further lowers the already impaired perceived respect (interindividual component of the achievement goal; see also Meier, Gross, Spector, & Semmer, 2013).

Conflict Outcomes

Proximal (affective) outcomes. Appraisal theories propose that goal congruence leads to positive affect and goal incongruence to negative affect (e.g., Frijda, 1986; Lazarus, 1991; Lazarus & Folkman, 1984; Scherer, 1987). Positive affect and negative affect are suggested to be orthogonal dimensions (which implies that both can be elicited simultaneously, Watson & Tellegen, 1985; Zevon & Tellegen, 1982). Hence, if task conflicts hinder the attainment of the interindividual component of the achievement goal to feel respected (goal *in*congruence) as well as promote the attainment of the intraindividual component of the achievement goal to gain knowledge (goal congruence), negative as well as positive affect are likely to arise. This negative affect should be higher during mixed conflicts than during task conflicts due to a higher *in*congruence between the desire to feel respected and the actually perceived respect during mixed conflicts compared to task conflicts. Similarly, positive affect should be lower during mixed conflicts than during task conflicts due to a lower congruence between the desire to gain knowledge and the actually perceived knowledge gain during mixed conflicts compared to task conflicts.

Distal (performance-related) outcomes. Positive affect should improve performance, whereas negative affect should impair performance on tasks unrelated to the task during which the conflict occurred (spill-over effects). More specifically, positive affect motivates individuals to put greater effort into a task and thereby should improve task

performance (Rich, LePine, & Crawford, 2010). Yet, Borman and Motowidlo (1993) suggested that performance does not exclusively depend on task performance but also on contextual behaviors that improve the organizational climate, such as helping colleagues (i.e., organizational citizenship behaviors; see Rotundo & Sackett, 2002). As positively-aroused individuals are more likely to engage in behaviors that foster a positive social environment among team members, such as helping others, positive affect should also lead to better contextual performance (Rich et al., 2010; Rodell & Judge, 2009). Thus, the more positive affect a conflict evokes, the better should be both task and contextual performance.

In contrast, negative affect reduces concentration and decreases the processing of complex information; hence it should have adverse effects on task performance (e.g., Blascovich et al., 2004; Eysenck, 1985; Reio & Callahan, 2004; Rodell & Judge, 2009). In addition, negative affect leads to avoidance behavior (e.g., Carver & Harmon-Jones, 2009) and thereby limits pro-social and other citizenship behaviors (Rodell & Judge, 2009). Thus, the more negative affect a conflict evokes, the poorer should be both task and contextual performance.

The Role of Personal Characteristics in Conflict Processing

Some situations (such as conflicts) may be evaluated as pleasant (task conflicts) or unpleasant (mixed conflicts) across individuals leading to more or less favorable conflict outcomes. However, it would be short-sighted to assume that everybody reacts in a similar way to a stressful situation, such as a dispute (e.g., Costa & McCrae, 1990). The evaluation of a task conflict should not only depend on the presence or absence of a relationship conflict as such but also on how individuals (automatically) respond to relationship conflicts during task conflicts (Schneider, 2004). Therefore, the "more elaborated" Conflict Episode Model also takes individual differences in the reaction to relationship conflicts into account (i.e., *personal characteristics*, see Figure 1).

Emotional Mimicry

The main difference between task conflicts and mixed conflicts is the affiliative tone during task and the *non*-affiliative tone during mixed conflicts. More precisely, during task conflicts, task-related disagreements are debated between interaction partners who have an affiliative stance towards each other. In contrast, during mixed conflicts, task-related disagreements are debated between interaction partners who have an antagonistic stance towards each other. Hence, task conflicts should not only be evaluated more positively than mixed conflicts because they help to attain the achievement goal but also because they help to attain the *affiliation* goal (i.e., the fundamental human desire for positive social interactions and interpersonal connectedness, also called the "need to belong"; see Baumeister & Leary, 1995). Yet, affiliative social encounters may be more important for some individuals than for others (i.e., individuals may differ in their affiliation motivation, Hill, 2009; McClelland, 1985). In consequence, some individuals may evaluate affiliative social interactions as more enjoyable and antagonistic social interactions as more harmful than others. Thus, I argue that the conflict evaluation should not only depend on the affiliative tone of the conflict interaction, but also on *how* individuals (automatically) respond to the emotional signals they observe during a conflict interaction. The extent to which an individual mimics their interaction partners' emotions may indicate the affiliativeness of the situation *and* the value affiliation has for this specific individual (i.e., an individual's affiliation motivation)–hence it may play an essential role for the conflict evaluation.

Emotional mimicry is the tendency to imitate perceived emotions of others (Hess & Fischer, 2013, 2014). Hess and Fischer (2013, 2014) argue that mimicry depends on the affiliativeness of the context: If others display affiliative intent, mimicry is likely to occur,

and if others display non-affiliative intent, mimicry is likely to be inhibited. Hence, individuals should mimic more during task conflicts than during mixed conflicts. Yet, there is a great variability between individuals with regard to the tendency to mimic affiliative and non-affiliative (i.e., antagonistic) facial expressions (e.g., Hess & Fischer, 2013). If individuals do not mimic during task conflicts (i.e., if they do not mimic smiles and other affiliative behaviors), it is plausible to assume that they do not reciprocate such behaviors because they do not value affiliation that much (that is, due to their low affiliation motivation; e.g., Hess & Fischer, 2016; Stanton, Hall, & Schultheiss, 2010). Similarly, mimicry during mixed conflicts (i.e., mimicry of antagonistic expressions or behaviors) may also give a hint to an individual's affiliation motivation. Reacting with a scowl to a scowl may indicate the displeasure that the scowl evoked in the individual. This displeasure should be higher for individuals who value affiliation highly than for those who do not (e.g., Stanton et al., 2010).

Affiliative mimicry (i.e., mimicry of affiliative behaviors), in turn, fulfills an affiliation function (Fischer & Hess, 2016; Hess & Fischer, 2013, 2014). Individuals feel connected with one another, which smoothens social interactions (Mauersberger, Blaison, Kafetsios, Kessler, & Hess, 2015). Thus, mimicry during task conflicts should further help to attain the affiliation goal (that is, it should further foster interpersonal closeness between interactants who already feel connected). Conversely, antagonistic mimicry (i.e., mimicry of antagonistic behaviors) has contrary effects. Mimicking scowls or other antagonistic behaviors impairs connectedness, and hence social satisfaction (Mauersberger et al., 2015). Thus, mimicry during mixed conflicts should further interfere with the attainment of the affiliation goal (that is, it should further disconnect interactants who already have an antagonistic stance towards each other).

Reflective Conflict Evaluation

Often, a first impression of a situation changes when taking into account additional parameters. For instance, imagine you have had a hard day and a good colleague of yours has not replied to an important request, even though you are almost sure they had read the text you sent them. The colleague suddenly enters the room with an innocent smile claiming not to have received the text and you cannot hold back your anger and start yelling at your colleague. How does this situation continue? The first impulse of the colleague would be probably to retaliate, as the colleague perceives the situation as highly (affiliation) goal-incongruent, triggering negative affective responses such as anger, which, in turn, leads to destructive behaviors. However, this retaliation may never actually occur because the colleague may notice the anxiety and the distress that you feel and may know about your critical life events (for instance, the colleague may know that you have had a stressful conversation with your boss today who has been putting pressure on you lately). Hence, the colleague may take a step back and re-evaluate the situation (e.g., Lazarus, 1991), which in turn may lead to more benevolent feelings, to less agitation and to a more constructive response. To accommodate this notion, the "advanced" Conflict Episode Model also takes such *reflective* evaluation (i.e., re-evaluation) processes into account (see Figure 1).

Cognitive Reappraisal

One effective antecedent-focused emotion regulation strategy that can de-escalate conflict situations is cognitive reappraisal. Reappraisal refers to re-evaluating a situation's meaning to alter one's emotional experience, and it can be used to up- or down-regulate emotions or to change the type of emotion experienced (Shiota & Levenson, 2009). In order to down-regulate emotions, individuals can either reframe the stressor in an objective, unemotional way (Gross, 1998) or focus on the positive aspects of the event (Shiota & Levenson, 2009). In contrast to other emotion regulation strategies such as suppression, most studies that have investigated the effects of reappraisal found it a powerful way to down-regulate stress and to improve well-being in stressful situations (see meta-analysis by Webb, Miles, & Sheeran, 2012).

Yet, the majority of studies on the effects of instructed reappraisal on negative affect and stress responses has used a set of videos or pictures to induce negative affect or stress. Such procedures, however, do not take into account the specific demands for emotion regulation in a *social* setting. Thus, when faced with a video or slide, it is possible to withdraw from the situation by closing the eyes, focusing on non-threatening content, or

turning away from the screen. However, it is typically not possible to withdraw from a social situation that easily. Further, reappraisal requires the individual to cognitively engage with the stressor to reframe its meaning, which may be more difficult when, at the same time, a task has to be completed. In other words, due to a considerable difference in *self-involvement* and *task demands*, the effects of instructed reappraisal on emotional reactions while passively viewing emotion-inducing stimuli may not be directly transferrable to the effects of instructed reappraisal on emotional reactions while actively engaging in a tense social situation. Sheppes and Meiran suggest that instructed reappraisal during a high-intensity social context consumes self-control resources (2008), and hence is not as effective in regulating negative affect (2007) compared to instructed reappraisal during a low-intensity non-social context (see Sheppes & Gross, 2011). Hence, instructed reappraisal may not work as effectively in a complex social situation, such as during a mixed-conflict situation. Its effectiveness in buffering negative affect during active social conflict situations may depend on whether the individual is familiar with the technique that requires individuals to override their automatic reaction to the conflict situation (e.g., Sheppes & Meiran, 2008).

Research Questions and Hypotheses

The objective of this dissertation was to investigate the unfolding and consequences of task conflicts compared to mixed conflicts and to study the effectiveness of an intervention aiming at buffering the harmful consequences of mixed conflicts. As outlined above, I first examined a) the appraisal processes that help to explain why task conflicts lead to healthier affective responses than mixed conflicts, and b) the affective responses that help to explain why task conflicts lead to better performance than mixed conflicts (Manuscript 1; see Figure 1, path 1). Secondly, I investigated the role of individual differences in the conflict situation (as a function of the type of conflict) on appraisal processes (Manuscript 2; see Figure 1, path 2). Finally, I examined the effectiveness of a reappraisal intervention (considering individual differences in the use of reappraisal) on affective conflict outcomes (Manuscript 3; see Figure 1, path 3).

1) Why do task conflicts lead to more positive affect, less negative affect, and better performance than mixed conflicts? (Manuscript 1)
   - *H1*: Individuals experience less negative affect because they feel more respected and they experience more positive affect because they gain more knowledge during task conflicts than during mixed conflicts.
   - *H2*: Individuals show better task performance after task conflicts than after mixed conflicts because they experience less negative affect and more positive affect during task conflicts than during mixed conflicts.
2) Which role do individual differences in emotional mimicry play during conflict situations? (Manuscript 2)
   - *H1*: The effects of mimicry on the evaluation of a conflict interaction differ as a function of the type of conflict; to the extent to which individuals mimic their interaction partners during task conflicts, they should feel more connected to their interaction partners; in contrast, to the extent to which individuals mimic their interaction partners during mixed conflicts, they should feel more disconnected from their interaction partners.
   - *H2*: The extent to which individuals mimic their interaction partners depends on the type of conflict and on an individual's affiliation motivation.
3) Is a reappraisal intervention able to reduce negative affective responses during mixed conflicts? (Manuscript 3)
   - *H1*: The effectiveness of reappraisal instructions during mixed conflicts varies as a function of the familiarity with the use of reappraisal; reappraisal instructions help to reduce negative affect primarily in individuals who know how to handle reappraisal.

Summary of Empirical Studies

The research questions and hypotheses were addressed in four studies presented in three manuscripts. As shown in Table 1 (and Figure 1, path 1), the first two studies examined the effects of situational demands (task conflicts versus mixed conflicts) on intuitive conflict evaluations and on a variety of proximal and distal conflict outcomes. Study 1 was a field study where conflicts were assessed using event-sampling methodology, whereas Study 2 was an experimental laboratory study where standardized conflicts were induced. The third study further examined the effects of situational demands (task conflicts versus mixed conflicts) on intuitive conflict evaluations, taking into account individual differences in emotional mimicry (see Table 1 and Figure 1, path 2). The last study examined the influence of more reflective conflict evaluations (reappraisal instructions) during mixed conflicts, taking into account the effect of individual differences in the use of reappraisal on proximal conflict outcomes (see Table 1 and Figure 1, path 3).

Table 1

Overview of the Four Empirical Studies

	Exogenous Variables	Endogenous variables
Manuscript 1		
Study 1– Field study	Situational demands (task conflict vs. mixed conflict)	Intuitive conflict evaluation (feelings of respect, knowledge gain) Proximal conflict outcomes (negative affect, positive affect) Distal conflict outcomes (performance)
Study 2– Laboratory study	Situational demands (task conflict vs. mixed conflict)	Intuitive conflict evaluation (feelings of respect, knowledge gain) Proximal conflict outcomes (negative affect, positive affect) Distal conflict outcomes (task performance, contextual performance)
Manuscript 2		
Study 3– Laboratory study	Situational demands (task conflict vs. mixed conflict) Personal characteristics (individual differences in emotional mimicry)	Intuitive conflict evaluation (interpersonal closeness)
Manuscript 3		
Study 4– Laboratory study	Reflective conflict evaluation (cognitive reappraisal vs. other/no instructions) during mixed conflicts Personal characteristics (individual differences in the use of cognitive reappraisal)	Proximal conflict outcomes (negative affect)

Manuscript 1

Measuring task conflicts as they occur: A real-time assessment of task conflicts and their immediate affective, cognitive and social consequences

The first manuscript examined the differential outcomes of task conflicts (i.e., task conflicts without relationship conflicts) and mixed conflicts (i.e., task conflicts with relationship conflicts), and the underlying mechanisms that help to explain *why* task conflicts lead to more healthy affective and performance-related outcomes than mixed conflicts. In contrast to most studies in this area, which used a cross-sectional design making it impossible to disentangle task conflicts from mixed conflicts, we used event-sampling and experimental methodology to examine our assumptions. In Study 1, 165 full-time employees (97 women), with a mean age of 35.4 years (*SD* = 9.68 years), reported and evaluated all conflicts they experienced during one consecutive workweek. In Study 2, 142 participants (95 women), with a mean age of 40.2 years (*SD* = 11.9 years), experienced and evaluated either a task conflict (*n* = 71) or a mixed conflict (*n* = 71) under controlled laboratory conditions. Both methods allow for real-time evaluations of conflicts to gain a better understanding of the unfolding of task and mixed conflicts. Immediately after the conflict, we measured proximal (affective) conflict outcomes. Further, we were interested in the effects of conflicts on distal conflict outcomes. In Study 1, employees reported on their daily productivity once a day after work. In Study 2, we measured task performance (divergent and convergent thinking) as well as contextual performance (prosocial behavior) following the conflict interaction.

In accordance with previous findings, we confirmed the adverse consequences of mixed conflicts in contrast to task conflicts. Further, we found support for the proposed mediating processes that help to explain why task conflicts lead to better affective well-being and better performance on tasks unrelated to the conflict itself than mixed conflicts. More specifically, consistent with our expectations, task conflicts allowed individuals to successfully use information provided by others and hence to gain knowledge. This *congruence* with the intraindividual component of the achievement goal produced positive affect. In contrast, relationship conflicts during mixed conflicts interfered with information intake, and hence limited knowledge gain and thereby reduced the congruence with the intraindividual component of the achievement goal. This, in turn, inhibited the emergence of positive affect.

Further, during task conflicts individuals felt disrespected, as own opinions were challenged. This *incongruence* with the interindividual component of the achievement goal

produced negative affect. Not surprisingly, this incongruence was notably more pronounced–resulting in more intense negative affect–when task conflicts turned into mixed conflicts. The reduction in positive affect explained why mixed conflicts led to poorer performance than task conflicts. By contrast, no such mediating effects could be found for negative affect.

The strong coherence across the two studies speaks for the robustness of the effects. These contribute to a better understanding of the nature and complexity of workplace conflicts as they provide new insights into the unfolding and the consequences of workplace conflicts.

Manuscript 2

When smiling back helps and scowling back hurts: Individual differences in emotional mimicry are associated with self-reported interaction quality during conflict interactions

The second manuscript examined the contribution of individual differences during conflict interactions. Task conflicts differ from mixed conflicts mainly in the affiliative tone of the interaction. Hence, we were interested in the role that individual differences in the (automatic) reaction to affiliative and non-affiliative emotions play for the evaluation of a conflict. Specifically, we focused on whether variability between individuals in the tendency to show emotional mimicry can explain the variance in the conflict evaluation *within* one type of conflict situation (that is, between individuals who experience task conflicts and between individuals that experience mixed conflicts). Individual differences in emotional mimicry should reflect an individual's affiliation motivation.

For this, 131 participants (89 women), with a mean age of 39.9 years (SD = 12.0 years), experienced either a standardized task (n = 65) or mixed conflict (n = 66) while facial electromyography was measured to assess mimicry. Following the conflict, we asked participants to evaluate the conflict interaction. Prior to the laboratory session, we additionally examined the strength of participants' affiliation motivation.

In line with our expectations, our data confirm the positive effects of mimicry for the evaluation of the conflict interaction during task conflicts but also demonstrate detrimental effects of mimicry for the evaluation of the conflict interaction during mixed conflicts. Further, the extent to which individuals mimicked their interaction partners informed about an individual's level of affiliation motivation across both types of conflict interaction. That is, individuals high in affiliation motivation generally showed more mimicry–even in non-affiliative contexts where the absolute level of mimicry was low. In sum, this study emphasizes the importance of considering individual differences during conflict processing for a better (i.e., more accurate) prediction of the evaluation of the conflict.

Manuscript 3

Only reappraisers profit from reappraisal instructions: Effects of instructed and habitual reappraisal on stress responses during interpersonal conflicts

The third manuscript tested the effectiveness of an antecedent-focused emotion regulation strategy (i.e., cognitive reappraisal) that modifies the spontaneous evaluation of the conflict situation and hence should buffer proximal (affective) conflict consequences. Specifically, we were interested in the interplay of experimentally-instructed and chronic reappraisal on a wide range of physiological, behavioral, and self-reported measures of negative affect during a mixed conflict. For this, 145 participants (96 women), with a mean age of 32.2 years (*SD* = 12.2 years), experienced a mixed conflict with the instruction either to reappraise the conflict situation (*n* = 48), to suppress their feelings during the conflict situation (*n* = 50), or with no instruction (*n* = 47), while cardiovascular and neuroendocrine measures were taken. Participants were allowed to eat sweet and salty snacks during the conflict situation. Further, participants reported on their negative emotions prior to as well as after the conflict.

We found that chronic reappraisers (i.e., individuals who know how to successfully apply reappraisal) effectively made use of the reappraisal instructions and profited from the positive effects of reappraisal instructions during a mixed conflict. That is, chronic reappraisers exhibited lower neuroendocrine reactivity and ate less unhealthy food under reappraisal instructions than under suppression or no instructions. This was not the case for individuals unfamiliar with the use of reappraisal. On the contrary, those individuals exhibited higher neuroendocrine reactivity under reappraisal instructions than under suppression or no instructions.

In sum, our findings demonstrate the effectiveness of a reappraisal intervention (in terms of alleviating the negative consequences of mixed conflicts) for chronic reappraisers. Individuals who typically engage in reappraisal used reappraisal more consistently when instructed to do so, and hence experienced less negative conflict consequences than individuals who typically do not engage in reappraisal.

Discussion

This dissertation had the aim to examine the dynamics of workplace conflicts to gain a better understanding of a) how they unfold (i.e., which central elements play a role during the processing of a conflict and the evaluation of a conflict) and b) their outcomes, to provide potential starting points for interventions that address conflicts at work. In Studies 1 and 2, we investigated a conflict episode in the field and in the laboratory from a situational point of view. Both studies contrasted the unfolding of task conflicts with the unfolding of mixed conflicts with the aim to explain why task conflicts lead to more desirable affective responses and better performance than mixed conflicts. In Study 3, we investigated the conflict episode in the laboratory from an interactional ("situation X person") point of view. Here again, we contrasted the unfolding of task conflicts with the unfolding of mixed conflicts, taking into account that individuals differ with regard to their perception and experience of one and the same situation. In Study 4, we aimed to evaluate a short laboratory intervention with the goal to buffer the negative consequences of destructive conflicts. Here, we examined the experience of mixed conflicts under different emotion regulation instructions.

All in all, we could find support for (most of) the hypotheses set out in the introduction. I will discuss the theory behind the hypotheses and report the findings of all four studies as well as their implications more detailed in the following sections.

The "Basic" Conflict Episode Model

Work conflicts belong to the most frequent stressors in the workplace (Keenan & Newton, 1985; Narayanan, Menon, & Spector, 1999) with detrimental effects on organizational outcomes (see de Wit et al., 2012, for an overview), probably due to the fact that conflicts impair employee health and well-being (e.g., Dijkstra, van Dierendonck, & Evers, 2005). Unhealthy employees take days off and are less efficient at work (see Riaz & Junaid, 2011), which may hurt productivity. However, a more complex picture emerges when task and relationship conflicts are distinguished: Task conflicts arise from incompatibilities in opinions about task-related issues and are defined as disagreements about the task itself or about the best way to accomplish the task. Relationship conflicts arise from personal animosity and dislike among team members (e.g., Jehn & Bendersky, 2003; Jehn, 1995). Whereas across studies relationship conflicts harm well-being and performance consistently (de Wit et al., 2012), task conflicts do not necessarily have negative consequences (e.g., Amason, 1996; Jehn & Mannix, 2001; Jehn & Chatman, 2000; Lovelace, Shapiro, & Weingart, 2001; Porter & Lilly, 1996; Todorova, Bear, & Weingart, 2014). The inconsistent

effects of task conflicts on various measures of satisfaction and productivity may result from the varying levels of relationship conflicts during task conflicts (e.g., Amason, 1996; Dijkstra et al., 2005; Simons & Peterson, 2000).

Yet, research on differential effects of task conflicts with relationship conflicts ("mixed conflicts") and task conflicts without relationship conflicts ("task conflicts") is rare and most of the studies cited above are correlational field studies based on retrospective reports over extended periods of time. To our knowledge, only one study has examined mixed conflicts and task conflicts in a controlled laboratory setting (Study 2; de Wit et al., 2013). De Wit and colleagues (2013) examined the rigidity in decision-making during task and mixed conflicts and found that individuals made less use of shared information during a mixed conflict compared to a task conflict, which then impaired task performance during a mixed conflict but not during a task conflict. Studies 1 and 2 were designed to extend the findings by de Wit and colleagues (2013). We wanted to unravel the unfolding of task and mixed conflicts in the laboratory and at the workplace to understand the differential effects of task and mixed conflicts on proximal as well as distal conflict outcomes. With "outcomes" we mean consequences for the individual after the conflict interaction came to an end. That is, we focused a) on the affective changes that task and mixed conflicts produce and on the question *how to explain* those affective changes, and b) on the cognitive consequences task and mixed conflicts have for the completion of subsequent tasks and on the question *how to explain* those cognitive consequences.

Affective conflict outcomes. It is not surprising that any type of conflict produces negative affect (e.g., Gamero, González-Romá, & Peiró, 2008; Jehn, 1997). However, the question arises why they do so and whether task conflicts produce less negative affect than mixed conflicts. Appraisal theories suggest that events that help the attainment of personal relevant goals produce positive affect, whereas events that hinder the attainment of personal relevant goals produce negative affect (e.g., Frijda, 1986; Lazarus, 1991; Scherer, 1987). A relevant goal at work is the achievement goal (the desire to be competent; Van den Broeck et al., 2010). We posited that mixed conflicts produce more negative affect than task conflicts because individuals evaluate mixed conflicts as more incongruent with the interindividual component of the achievement goal (the desire to feel respected by others; Nicholls, 1984) than task conflicts. Our results support this hypothesis. We found that individuals reported lower feelings of respect during mixed conflicts than during task conflicts and this difference in perceived respect then explained why mixed conflicts led to more negative affect than task

conflicts. This is in line with the idea that individuals may feel slightly disrespected during task conflicts but extremely disrespected during mixed conflicts (e.g., Dreu & van Knippenberg, 2005; Meier et al., 2013), because interpersonal frictions unrelated to the task at hand threaten the perceived status of individuals in a social network (e.g., Semmer, Jacobshagen, Meier, & Elfering, 2007). In turn, feeling inferior and disrespected leads to a series of negative emotions (Blincoe & Harris, 2011).

Further, conflicts (at least task conflicts) seem to also produce positive affect (Todorova et al., 2014). We hypothesized that task conflicts produce more positive affect than mixed conflicts, because individuals would evaluate task conflicts as more congruent with the intraindividual component of the achievement goal (the desire to gain knowledge; Nicholls, 1984) than mixed conflicts. Our results also support this hypothesis. We found that individuals reported more knowledge gain during task conflicts than during mixed conflicts and this difference in perceived knowledge gain then explained why task conflicts led to more positive affect than mixed conflicts. This is in line with the finding that 1) task conflicts enable information acquisition and learning–processes that relationship conflicts during mixed conflicts disturb (e.g., de Wit et al., 2013) and 2) information acquisition during (task and mixed) conflicts mediates the effect of the experience of (task and mixed) conflicts on positive affect (Todorova et al., 2014).

Performance-related outcomes. As mentioned above, de Wit and colleagues (2013) found that mixed conflicts led to worse performance (on the task during which the conflict occurred) than task conflicts due to a bias in information use during mixed conflicts. We posited similar effects for the performance on subsequent tasks. However, our argumentation deviates from de Wit and colleagues (2013): Both differences in positive affect and differences in negative affect during task and mixed conflicts can explain differences in performance after task and mixed conflicts. Thus, we predicted that task conflicts would lead to better (task and contextual) performance than mixed conflicts because (1) individuals should experience more negative affect during mixed conflicts than during task conflicts (see above) and negative affect inhibits cognitive and social functioning (Drevets & Raichle, 1998; Rodell & Judge, 2009), and (2) individuals should experience more positive affect during task conflicts than during mixed conflicts (see above) and positive affect increases task motivation and performance as well as prosocial behaviors (Rich et al., 2010; Rodell & Judge, 2009).

Our findings revealed that positive affect–but not negative affect–explained why task conflicts led to better performance than mixed conflicts. This null effect of negative affect on

performance may be surprising at first sight. Anxious individuals are easily distracted as they ruminate about what might have gone wrong during the conflict interaction. Hence, anxiety should impair performance (e.g., Harris & Menzies, 1999; Smith et al., 2001). However, anxiety is not the only type of negative affect. Specifically, negative affect does not only entail avoidance-motivated emotions such as anxiety, but also approach-motivated emotions such as anger. Similar to positive affect, anger mobilizes energy and focuses attention (Frijda, 1986; Roseman, Wiest, & Swartz, 1994). Hence, it has recently been called a "positive emotion" (at least for the person who feels and expresses it; see Hess, 2014). In accordance with this idea, Mendes, Major, McCoy, and Blascovich (2008) found that feeling angry improves performance in a word-finding task. Consequently, the negative effects of anxiety on performance may have counteracted the potential positive effects of anger on performance, leading to a null effect of negative affect on performance (see also Reio & Callahan, 2004, for a comparison of the effects of anger and anxiety on performance).

Summary of findings. Taken together, our first two studies provide important insights into the mechanisms outlining why conflicts at work improve or impair well-being and performance. The aim of the studies was to investigate the conflict-evaluation processes that help to explain why task conflicts lead to more healthy affective responses than mixed conflicts and to examine the affective responses that help to explain why task conflicts lead to better performance than mixed conflicts. Supporting our assumptions, the present findings show that mixed conflicts come along with lower positive affect and higher negative affect than task conflicts. This can be explained by the finding that relationship conflicts (which differentiate task conflicts from mixed conflicts) hinder the learning experience and make individuals feel extremely disrespected during the task-related disagreement. Then again, the lower the positive affect was, the more detrimental were the effects of task and mixed conflicts on performance.

The "More Elaborated" Conflict Episode Model

In the previous section, I examined the "basic" Conflict Episode Model–a situational view on the conflict period. This model takes a nomothetic view of the conflict process. Yet, even though mixed conflicts may be evaluated less favorably than task conflicts across individuals, there is reason to believe that some individuals may be better at coping with mixed conflicts than others (e.g., Shewchuk, Elliott, MacNair-Semands, & Harkins, 1999). Hence, an individual difference perspective needs to be added to the model. For this, we focused on emotional mimicry as an index of affiliative stance.

Specifically, the main difference between task and mixed conflicts is the *affiliative* tone of the conflict interaction. During task conflicts, opinions are criticized but interaction partners have an affiliative stance towards each other. In contrast, during mixed conflicts, opinions are criticized and interaction partners have, additionally, apart from the task-related disagreement, an antagonistic stance towards each other. Hence, task conflicts and mixed conflicts should not only differ in their potentiality to satisfy the achievement goal but also in their potentiality to satisfy (or frustrate) the affiliation goal (the desire for friendly interpersonal encounters and social bonding; e.g., Baumeister & Leary, 1995). Task conflicts should be evaluated more positively because they help the attainment of the affiliation goal to feel connected with others, whereas mixed conflicts should be evaluated more negatively because they hinder the attainment of the affiliation goal to feel connected with others. Further, as individuals differ with regard to their affiliation motivation (i.e., with regard to the extent to which they value affiliation*;* Hill, 2009; McClelland, 1985), task and mixed conflicts' evaluation should not only depend on the conflicts' potential to satisfy the affiliation goal but also on the individuals' affiliation motivation. In other words, the evaluation of a conflict should not only depend on the affiliative tone of the disagreement *as such* but also on the *value* affiliation has for every single individual (e.g., Bono, Boles, Judge, & Lauver, 2002; Workman, 2015). An elegant way to measure this individual difference at the very moment of the conflict situation is by examining the individual's imitation of the affiliative (or antagonistic) signals they observe during a conflict interaction. More specifically, the assessment of emotional mimicry (which is the imitation of the perceived emotions of others; e.g., Hess & Fischer, 2013, 2014) should capture both the presence (vs. absence) of affiliative intent and the extent to which individuals value affiliation (see also Fischer & Hess, 2016; Hess & Fischer, 2016).

Situational effects on emotional mimicry. Mimicry fulfills a key social regulation function (Fischer & Hess, 2017; Hess & Fischer, 2013, 2014). Specifically, mimicry creates rapport and affiliation between interactants. Of course, mimicry can only serve this function if an affiliation goal exists in the first place. If others clearly display non-affiliative intent, it is very likely that individuals refrain from mimicking their emotions to keep them at a distance. Thus, whereas affiliative emotions generally invite mimicry as a means of reciprocating affiliation, antagonistic emotions generally discourage mimicry responses as a means to gain distance from unfriendly others (e.g., Fischer & Hess, 2017; Hess & Fischer, 2013, for an overview). Hence, we expected less mimicry during mixed conflicts than during task

conflicts. This is exactly what we found in the third study. Even though mimicry took place both during task and during mixed conflicts, it was more pronounced during task conflicts than during mixed conflicts. This is in line with research showing that mimicry does not occur or is reversed when others are (expected to be) competitors with opposing goals (Lanzetta & Englis, 1989; Likowski, Mühlberger, Seibt, Pauli, & Weyers, 2011; Weyers, Mühlberger, Kund, Hess, & Pauli, 2009).

Individual differences in emotional mimicry. More interestingly, however, is the question whether there is evidence of individual differences in mimicry within a task-conflict situation and within a mixed-conflict situation, and whether individual differences in mimicry can predict the evaluation of the conflict situation over and above the affiliative tone of the conflict interaction. As mentioned above, individuals mimicked more during task conflicts than during mixed conflicts. Nevertheless, we could find mimicry during mixed conflicts (see Hess & Fischer, 2013, for the conclusion that on a group level, mimicry of antagonistic emotions displayed by strangers often emerges despite its overall lower probability of occurrence). This finding suggests that some individuals lack the ability to cope with personal offences and protect themselves from signals of rejection. Indeed, individuals differ with regard to their tendency to mimic non-affiliative facial expressions: Mauersberger and colleagues (2015) found that only some individuals imitated antagonistic emotions, such as disgust. Even though these congruent facial responses to antagonistic emotions superficially resemble mimicry, it is more correct to consider them reactive emotional responses to an emotional display that is perceived as unpleasant (Hess & Fischer, 2014). The display of antagonistic emotions may be especially *unpleasant* for individuals who place a great deal of importance on the affiliative stance between interaction partners during social interactions (i.e., for individuals with a high affiliation motivation; e.g., Stanton et al., 2010). Similarly, not all individuals imitated affiliative expressions, such as sadness or happiness, to the same extent (Mauersberger et al., 2015), because affiliative emotional displays may also be perceived as more or less pleasant depending on the individual's affiliation motivation. That is, the display of affiliative emotions may be especially *pleasant* for individuals with a high affiliation motivation (Stanton et al., 2010). Hence, we predicted that mimicry during both task conflicts and mixed conflicts would reflect an individual's affiliation motivation. In contrast to the positive effects of mimicry of affiliative emotions for social interactions, the imitation of antagonistic emotions impairs rapport and mutual understanding during a social interaction (Mauersberger et al., 2015). Thus, we assumed that to the extent to which mimicry

during task conflicts (i.e., genuine or affiliative mimicry) takes place, individuals would perceive a closer connection to their interaction partners. In contrast, to the extent to which mimicry during mixed conflicts (i.e., reactive or antagonistic mimicry) takes place, individuals would perceive a greater distance to their interaction partners.

In line with our expectations, we found in our third study that not only the affiliativeness of the conflict situation (i.e., the main difference between task and mixed conflicts) but also individual differences in mimicry played a role for the evaluation of the conflict situation. That is, not only did participants feel more connected to their interaction partners during task conflicts than during mixed conflicts, but mimicry during task conflicts predicted even more interpersonal closeness (as mimicry here consisted mainly of affiliative mimicry). In contrast, mimicry during mixed conflicts predicted even higher interpersonal distance (as mimicry here consisted mainly of antagonistic mimicry). This is in line with findings by Mauersberger and colleagues (2015): In contrast to the generally positive effects of affiliative mimicry on mutual liking and the overall evaluation of the interaction (e.g., Sonnby-Borgström, 2016; Stel & Vonk, 2010; Yabar & Hess, 2007), antagonistic mimicry predicted feelings of mutual misunderstanding and dislike during conversations (see also Kurzius & Borkenau, 2015, for similar effects of mimicry of negative in contrast to positive behaviors). Further, affiliation motivation predicted mimicry irrespective of the type of conflict situation. Thus, individuals high in affiliation motivation seem to always show more mimicry–even in contexts that do not invite affiliation. This finding lends support to theories of mimicry that emphasize the desire to affiliate (e.g., Chartrand & Lakin, 2013; Fischer & Hess, 2017; Hess & Fischer, 2013).

Summary of findings. Taken together, the aim of the third study was to investigate the role of personal characteristics in the conflict situation (as a function of the situational demands) on conflict-evaluation processes. In accordance with our assumptions, Study 3 showed that individuals differ in their (automatic) reaction to task and mixed conflicts (i.e., in the extent to which they mimic interaction partners during task and mixed conflicts), as they differ in the level they perceive interaction partners' affiliative facial expressions (which often occur during task conflicts) as pleasant and interaction partners' antagonistic facial expressions (which often occur during mixed conflicts) as unpleasant. Mimicry, in turn, had beneficial effects on the evaluation of the conflict interaction during task conflicts but had detrimental effects on the evaluation of the conflict interaction during mixed conflicts. Hence,

for a precise prediction of the evaluation of a conflict, it is useful to take into account individual differences during conflict processing in addition to situational demands.

The "Advanced" Conflict Episode Model

In the last two sections, the evaluation of the conflict situation reflected a simple *if-then* mechanism. *If* an individual perceives a situation to be congruent with a relevant personal goal, *then* a positive evaluation should take place. *If* an individual perceives a situation to be incongruent with a relevant personal goal, *then* a negative evaluation should take place. Yet, taking a step back and adopting a meta-perspective on the situation may change the extent to which the situation is perceived as goal-(in)congruent. Cognitive efforts, such as attempts to comprehend the interaction partner's inner feelings or to realize that the situation is only a small fraction of one's life on this earth, may trigger reflective thoughts aimed to modify the intuitive "quick and dirty" evaluation of the conflict situation (e.g., Lazarus, 1991). In turn, cognitive efforts to re-evaluate the situation may pay off. More precisely, re-evaluating the conflict situation may change conflict outcomes. Even when a situation may seem negative, an early (antecedent-focused) intervention that alters the emotional significance of the situation may be able to reduce the negative affect that the situation would usually generate. This intervention is called cognitive reappraisal and it usually entails thinking about the situation in a way that changes undesirable affective states, such as negative emotions and stress responses (Gross, 2014). In contrast to response-focused regulation strategies such as suppression, reappraisal decreases negative affective experiences and increases positive affective experiences but has no adverse social or cognitive consequences (Gross, 2014). Hence, we posed the question of whether reappraisal might be an effective intervention that is able to buffer the negative consequences of the devastating mixed conflicts.

The peculiarity of tense *social* situations. Yet, as the majority of studies on the effects of instructed reappraisal investigated the effects of reappraisal in a passive non-social situation, its effectiveness in a complex social conflict situation remains unclear (Webb et al., 2012). We assumed that instructed reappraisal would not work as effectively in a complex social situation, such as during a mixed-conflict situation. The results of Study 4 support this claim. That is, we did not find a main effect of reappraisal instructions during mixed conflicts on affective conflict outcomes. Our findings are in line with the conclusion by Webb and colleagues (2012) that the effectiveness of instructed reappraisal varies as a function of the intensity and *sociability* of the situation: Whereas instructed reappraisal consistently buffered

negative affect during passive picture viewing, the findings regarding the effect of instructed reappraisal on negative affect within unpleasant social encounters reveal inconsistent results (Webb et al., 2012). Especially during tense social stressors, instructed reappraisal sometimes increased (e.g., Denson, Creswell, Terides, & Blundell, 2014), sometimes decreased (e.g., Ben-Naim, Hirschberger, Ein-Dor, & Mikulincer, 2013; Gong, Li, Zhang, & Rost, 2016), and sometimes did not have clear effects on emotions and (physiological) stress responses (Butler et al., 2003; Butler, Gross, & Barnard, 2014).

The moderating effects of individual differences in the use of reappraisal. It should be considerably easier for individuals familiar with the instructed process to comply with instructed reappraisal's requirement to override the automatic reaction to the mixed conflict (e.g., Sheppes & Meiran, 2008). Hence, we predicted that individuals who are experienced in reappraisal would profit from experimentally-induced reappraisal, as those individuals are capable to apply reappraisal in a tense social situation, such as during a mixed conflict. In contrast, individuals unfamiliar with reappraisal may be incapable to make use of this beneficial strategy; hence we assumed that they would not be able to profit from the positive consequences of reappraisal.

Indeed, we found that during mixed conflicts, instructed reappraisal only worked efficiently when individuals were familiar with the instructed process. Specifically, reappraisal instructions in our study only led to effective reappraisal use and its associated buffering effects on physiological and behavioral indices of negative affect for those individuals who habitually use reappraisal and hence are familiar with the technique. In tense social situations, such as during mixed conflicts, it seems to be just as important to consider the effects of personality and individual differences as to consider the effects of instructed behaviors or requested actions. This is in line with the few studies that investigated reappraisal in a social setting. For instance, instructed reappraisal did not affect stress in unacquainted pairs of women who discussed a distressing problem (Butler et al., 2003). In contrast, during discussions with partners, chronic reappraisal increased perceptions of constructive criticism (Klein, Renshaw, & Curby, 2016). To our knowledge, no other study has examined the combined effects of instructed and chronic reappraisal.

In contrast to the positive effects of instructed reappraisal in individuals familiar with reappraisal, those who described themselves as not using reappraisal very frequently failed to use reappraisal effectively and experienced more negative effects when instructed to reappraise during mixed conflicts. Due to the high intensity of the situation, individuals may

have inadequately tried to implement what is expected from them while getting even more stressed, as the inhibition of their natural occurring tendency to perceive and react to the emotional content of a situation consumed cognitive resources that would have been needed to appropriately handle the social conflict situation (e.g., Creswell, Pacilio, Lindsay, & Brown, 2014; Sheppes, Catran, & Meiran, 2009). Alternatively, individuals unfamiliar with reappraisal may have simply forgotten the instructions that were incongruent with their customary way of coping with stressful interpersonal situations. Yet, during the debriefing, we asked whether participants remembered the instructions they received prior to the experience of the mixed conflict and only a small percentage of participants could not repeat the exact wording of the instructions. Thus, even though individuals unfamiliar with reappraisal understood the goal they should achieve, they did not know *how* to achieve it, and hence used a different tactic or gave up after ineffective attempts–thus reporting not to have followed the specific instructions given to them. Further, the (ineffective) attempts to follow the instructions added cognitive strain to an already demanding task leading to more rather than less stress in those individuals.

Physiological and self-reported negative affect. We assessed affective reactions through self-reported negative emotions, physiological indices of negative affect (cardiovascular and neuroendocrine reactivity), as well as through snack food intake as a behavioral index of negative affect (e.g., Cartwright et al., 2003; Groesz et al., 2012). In contrast to the consistent buffering effects of instructed reappraisal in individuals familiar with reappraisal on the cortisol reactivity and behavioral indices of negative affect, effects on negative emotions did not emerge. Individuals familiar with reappraisal did not report less negative emotions in the reappraisal condition compared to the control conditions. It is possible that even if individuals familiar with reappraisal may in fact effectively handle interpersonal conflicts when reminded of their well-known emotion regulation strategy "reappraisal", they understand that the situation is unpleasant, and hence report feeling negative, even if they do not feel as negative as individuals unfamiliar with reappraisal. As the conflict ends with a hurtful remark by the interaction partner, it is also possible that the report of feeling negative is due to lingering feelings of hurt.

Alternatively, the negative emotions reported some time after the end of the stressful event (when self-reports were taken) may not reflect the negative affect *during* the actual stressor. Specifically, the null effect of instructed reappraisal on negative emotions in individuals familiar with reappraisal could reflect the "mood-buffering cortisol effect" (Het,

Schoofs, Rohleder, & Wolf, 2012) such that post-stress negative emotions actually inversely relate to post-stress cortisol levels. Taking into account that (due to the time delay of the cortisol responses) post-stress cortisol levels reflect the negative affect during a stressor, whereas post-stress negative emotions reflect post-stress negative affect, Het and colleagues (2012) suggest that a pronounced cortisol response may help to cope with negative emotions during the stressor leading to attenuated negative emotions after the expiration of the stressor. Thus, it is possible that individuals familiar with reappraisal, who were asked to reappraise, reported lower levels of negative emotions after the end of the conflict because of an effective use of this strategy, whereas the other groups reported lower levels of negative emotions after the end of the conflict because by that time the mood-buffering cortisol effect had set in.

Finally, a contrast effect may explain the lack of effect on the negative emotions: The relief of the stressful task being over may have been more pronounced in individuals who experienced the task as especially threatening. This may have led to a bigger drop in negative emotions after the conflict in those who felt more negative during the conflict compared to those who successfully regulated their emotions during the conflict.

Summary of findings. Taken together, the aim of the fourth study was to test the effectiveness of a conflict re-evaluation (i.e., reappraisal) intervention on affective conflict outcomes during mixed conflicts taking into account individual differences in the use of reappraisal. In accordance with our assumptions, we found that during mixed conflicts, the effectiveness of instructed reappraisal for buffering negative affective conflict consequences depended on individuals' internalized habits and acquired competencies. Whereas people familiar with the application of reappraisal indeed profited from this generally advantageous strategy, people unfamiliar with the usage of reappraisal were put under stress even more when instructed to reappraise in mixed-conflict situations.

Strengths and Limitations

We conducted four studies with the aim to gain insights into the dynamics of workplace conflicts. The first two studies aimed to understand the underlying fine-grained mechanisms that help to explain why task conflicts and mixed conflicts have differential affective and performance-related consequences. In contrast to most other research in the field of workplace conflicts, which used a cross-sectional design based on retrospective self-reports (see de Wit et al., 2012, for an overview), our first two studies used event-sampling methodology–where participants reported all conflict interactions they experienced during five consecutive workdays–and experimental methodology with controlled laboratory

conditions–where participants experienced standardized and prerecorded but still ecologically valid conflict interactions–on an individual level of analysis. Hence, we were able to examine the short-term effects of workplace conflicts that involve appraisals as well as affective changes. Using these methodologies, we could extend previous findings (de Wit et al., 2013) showing that task conflicts led to better performance than mixed conflicts with performance measures that were partly (Study 1) or entirely (Study 2) unrelated to the conflict situation itself. Whereas de Wit and colleagues (2013) only examined effects on decision-making, we investigated effects on daily productivity, convergent thinking, divergent thinking and prosocial behaviors. Further, we introduced an important mediator that has been recently confirmed to play an important role in the course of task and mixed conflicts (Todorova, Bear, & Weingart, 2014): positive affect. Positive affect explained why performance suffered more from mixed conflicts than from task conflicts. Additionally, we found an explanation for why positive affect was higher and negative affect was lower during task conflicts than during mixed conflicts: During task conflicts, individuals learned more and felt more respected than during mixed conflicts. Importantly, the results of both studies were extremely consistent even though a completely different methodology was used.

The third study adopted a broader view on the conflict itself: Whereas I originally assumed that conflict processing solely depends on the type of conflict that is experienced, this study extends this narrow perspective and takes into account that conflict processing depends on the interaction of situational demands (type of conflict) and personal characteristics (individual differences in the reaction to different types of conflicts). To my knowledge, Study 3 is the first study that examined the effects of individual differences in emotional mimicry during task and mixed conflicts. We found that mimickers evaluated task as well as mixed conflicts differently than non-mimickers. Further, in this study, we were able to point to a predicted but never-tested antecedent of mimicry, namely, affiliation motivation.

The fourth study used the insights gained in Studies 1 to 3 to reflect upon and investigate strategies that help to buffer the negative consequences of the "bad" mixed conflicts. For this, I expanded the view on the conflict-evaluation process (which is *the* step during the conflict episode that predominately determines the severity of the conflict's consequences) considering that it is possible to alter situation appraisals via reappraisal instructions. Specifically, Study 4 examined the effect of a cognitive reappraisal intervention during mixed conflicts on a broad range of physiological indices of negative affect taking into account individual differences in the knowledge about how to use reappraisal. Study 4 is the

first of its kind regarding the complexity, active involvement, and sociability of the situation that was used to examine the effectiveness of reappraisal instructions. In contrast to the majority of studies that examined reappraisal instructions during simple passive non-social picture viewing, we used a validated conflict scenario during which individuals discussed a real problem with a simulated interaction partner after they had received reappraisal instructions. Further, to our knowledge, this study is the first that has examined the differential effects of reappraisal instructions during complex social encounters for individuals familiar and unfamiliar with the use of reappraisal.

Despite the strengths of our studies, they obviously also have several limitations. In Study 1, due to time constraints, we used single items to measure all the constructs that were assessed during the working day. Critics claim that single-item measures have inferior psychometric properties compared to multiple-item measures. Yet, it is a common procedure to shorten scales in event-sampling studies. For this, we followed the recommendations from a recent study (Fisher, Matthews, & Gibbons, 2016), and carefully selected as well as pretested all our single-item measures with an independent sample of 96 participants prior to the data collection of Study 1. Further, we used self-reports to measure both conflict and performance evaluations in Study 1. Thus, our results could be inflated due to common-method variance. It would have been preferable to use an objective measure or a different source (i.e., the rating of a supervisor) to measure performance. Yet, due to a time lag between the two measurements (as participants rated their performance in the evening several hours after they had evaluated their conflicts), we believe that a self-report methodology was acceptable (Loughry & Amason, 2014). It should also be noted that we were primarily interested in the within-person relationships in Study 1. Thus, supervisors would have needed to have a very close connection to our participants to be able to notice participants' daily performance fluctuations. However, to include only employees with an intimate connection to superiors would have limited the generalizability of our findings.

In Study 2, we addressed the limitations of Study 1. We used full-length scales and measured performance with several performance tests instead of self-reports. Yet, Study 2 was a scenario study in which participants experienced a standardized laboratory conflict with a *prerecorded* interaction partner. For this, we filmed four actors sitting in the room where the experiment was going to take place afterwards. We selected the final set of video statements (160) from a set of over 1600 videos and confirmed during two separate pretests the authenticity of the actors in each take and the emergence of the intended differences between

the takes from the task and from the mixed-conflict condition. We chose this format, as we wanted to simulate a real conflict while simultaneously limiting the distortive effects of participants' sympathy and attractiveness for confederates' behavior that could then have influenced participants' conflict perceptions. Still, the fact that we used prerecorded videos may have limited the generalizability of our findings as, even though we had a wide selection of videos, sometimes the chosen video statements did not fit perfectly to participants' answers. However, in response to an open-ended suspicion probe, less than 15 % of the participants reported any doubt that the interaction partners were genuine. Most participants had been very involved in the task, and hence did not notice small inconsistencies in the video statements. Further, the exclusion of those "doubters" did not decrease the effect sizes of the significant effects. Hence, it is plausible that the effects of our simulated conflict scenario did not depend on the credibility of the actors. Participants may have evaluated the conflict similarly, felt similarly and performed similarly if the interaction partner had been a real person. This suggestion fits to the finding that the manipulation of the appropriateness of others' behaviors during virtual interactions has a lasting effect on well-being even for participants who were told (for instance during a social exclusion paradigm) that the unreasonable other is a computer instead of a real person (Zadro, Williams, & Richardson, 2004).

Study 3 expanded the situational view on the conflict episode taking into account that appraisals not only depend on the demands of the stressor, but also on the individuals' preferences. Hence, the conflict evaluation should not only depend on whether the conflict helps or hinders the attainment of a fundamental human goal but also on the value an individual ascribes to a specific goal. Study 3 examined whether the conflict situation helped to attain the affiliation goal considering an individual's affiliation motivation (i.e., the extent to which an individual values affiliation). This may be counterintuitive at first, because, even though both the affiliation goal and the achievement goal should be personally relevant goals in everyday work life, the achievement goal may be overall more important at the workplace than the affiliation goal. Yet, as we wanted to measure the importance of a goal that the conflict interaction satisfies or frustrates at the *very moment* of the interaction, we decided to measure an individual's importance of affiliating with others by continuously measuring emotional mimicry during the conflict interaction. Future research should develop a similar unobtrusive measure of an individual's achievement motivation during a social situation to be able to examine in a second step whether the conflict evaluation also depends on an

individual's achievement motivation besides the conflict situation's potential in helping to attain the achievement goal.

In Study 4, we investigated a re-evaluation intervention aimed to attenuate the negative effects of mixed conflicts. More precisely, we investigated the effect of reappraisal instructions taking into account individual differences in the use of reappraisal on affective reactions measured through self-reported negative emotions, physiological indices of negative affect (cardiovascular and neuroendocrine reactivity), as well as through snack food intake as a behavioral index of negative affect (e.g., Cartwright et al., 2003; Groesz et al., 2012). As mentioned above, we could only find the proposed buffering effects of instructed reappraisal in individuals familiar with reappraisal on cortisol reactivity and behavioral indices of negative affect but not on the negative emotions participants reported after the conflict interaction. I described several possible explanations for the lack of effect on the negative emotions above. However, to avoid discrepancies between physiological and self-reported negative affect from the beginning, we could have measured negative emotions several times during the course of the conflict interaction (Campbell & Ehlert, 2012). Yet, the laboratory-conflict situation had the intention to imitate a real-life conflict as good as possible. Repeated ratings in between the conflict discussion could have hindered the effective implementation of this plan. Nevertheless, future studies should try to develop and test an unobtrusive measurement of negative emotions during the course of a social interaction.

In all four studies, we adopted an individual-centered view on the conflict episode. The aim was to explore the unfolding of a conflict episode from the perspective of one single conflict party. This allowed us to develop simple and straightforward designs that are easy to follow and are still coherent and conclusive. Yet, whether or not a conflict escalates does not exclusively depend on what has been said or done by one person but on what has been said or done by all conflict parties. Hence, on the one hand, it would have been preferable to collect measures of conflict outcomes (such as conflict handling styles) as well as reports of interaction quality from all conflict parties. On the other hand, including these measures into our studies would have gone beyond the present goals of the project and would have made the whole project additionally complex and cumbersome. I believe that the way we designed our studies promotes future research in this area that can now build on our findings and collect well-being and performance measures from all parties involved in the conflict situation to round out the picture of the conflict episode.

In sum, the four studies explored the evaluation and the effects of task and mixed conflicts (Studies 1 and 2), the role of the individual in the evaluation of task and mixed conflicts (Study 3), and a cognitive strategy aimed to change the evaluation of the painful mixed conflicts (Study 4). Despite several limitations mentioned above, the present research contributes to a better understanding of the course of workplace conflicts and sheds light on possible strategies to prevent the negative effects of workplace conflicts.

Conclusion

As a result of higher demands for innovation and creativity and more decentralized organizational structures in combination with technological advances, the nature of work has changed considerably in the recent years becoming more interactive and less location-dependent (Howard, 1995). In order to maximize innovative outputs, tasks are distributed among partners not only within one location but also between several countries. However, due to the reduction of communication channels in virtual communication and higher cultural diversity of teams that operate in different countries, misunderstanding and dissent during task processing is inevitable (e.g., Bouncken & Winkler, 2010; Zakaria, Amelinckx, & Wilemon, 2004). Yet, in contrast to interpersonal incompatibilities (i.e., relationship conflicts), certain types of conflicts–task-related disagreements (i.e., task conflicts)–may be helpful for effective decision-making and may even evoke positive affect under certain circumstances. Nevertheless, recent meta-analyses and reviews came to the conclusion that the negative effects of task conflicts outweigh their positive effects (Bradley et al., 2015; de Wit et al., 2012; Loughry & Amason, 2014; O'Neill et al., 2013). One reason for this discouraging bottom line may be that task conflicts often co-occur with relationship conflicts, which makes it impossible to investigate the distinct effects of task conflicts–especially in retrospective field studies. We took a closer look on the differential effects of task conflicts that occur without relationship conflicts (which I simply called "task conflicts" in the previous sections) and task conflicts that occur with relationship conflicts (which I called "mixed conflicts" in the previous sections) with experimental and event-sampling methodology in three studies (Studies 1 to 3). We confirmed that the detrimental nature of task conflicts depends on the level of co-occurring relationship conflicts. Task conflicts without relationship conflicts were evaluated more positively leading to a more advantageous state of well-being and better performance results than task conflicts with relationship conflicts. The gap in the evaluation between task conflicts with relationship conflicts and task conflicts without relationship conflicts grows even larger in individuals who tend to mimic

the emotions of their interaction partners. Hence, particularly for individuals who are sensitive to the emotional tone of the interaction, relationship conflicts during task conflicts reduce the positive effects of task conflicts thereby turning conflicts into experiences that may promote burnout, absenteeism, and eventually turnover intentions. Thus, relationship conflicts during task conflicts should be prevented in order to ensure fruitful task-related discussions with positive affective, cognitive, and social consequences. Especially during virtual task processing where diversity in opinions may more easily emerge, it is important to establish a positive surrounding with no (time or similar) constraints, where employees are able to discuss task-related issues in a constructive way without exposing or discrediting each other.

However, if it is not possible to prevent task conflicts that occur in the context of relationship conflicts or task conflicts that lose their focus on the task and escalate into relationship conflicts, there may be options to hinder or attenuate their negative consequences. One of those options was the topic of our final study (Study 4): We investigated the effect of a re-evaluation intervention in a situation where task conflicts occurred in the context of relationship conflicts. On the basis of our results, I would suggest that training individuals to re-evaluate (i.e., reappraise) tense situations (as emotion regulation, such as cognitive reappraisal, is a skill, which can be practiced and expanded; Arthur, Bennett, Edens, & Bell, 2003; Berking & Lukas, 2015), and, importantly, reminding those trained individuals during stressful times of the skill they had learned may help to buffer the negative impact of harmful workplace conflicts if they cannot be avoided all along.

In sum, as conflicts are ubiquitous obstacles during interactions in general and at the workplace in particular, the basic challenge for conflict research is to understand the circumstances under which the most prominent type of workplace conflicts, that is, task conflicts, hurt and benefit satisfaction and productivity. Ready to accept this challenge, we decided to investigate the most plausible circumstance (i.e., the presence versus absence of relationship conflicts) in greater detail. The insights gained from our studies may promote healthier task-related discussions that may form a basis for innovative developments. This, in turn, may have a vital impact on personal, social, and economic outcomes. As Zachary (1998, p. 65) said: “Today the essential ingredient in any successful project or enterprise is the capacity for [constructive] dissent … among its teams. Nothing else really matters.”

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Note. This full reference list contains references from the synthesis and references from the original manuscripts.

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Appendix A: Manuscript 1

Mauersberger, H., Hess, U., & Hoppe, A. (in press). Measuring task conflicts as they occur: A real-time assessment of task conflicts and their immediate affective, cognitive and social consequences. *Journal of Business and Psychology.*

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ORIGINAL RESEARCH

Measuring task conflicts as they occur: a real-time assessment of task conflicts and their immediate affective, cognitive and social consequences

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Abstract
When two or more individuals with different values, interests, and experiences work together, interpersonal conflicts are inevitable. Conflicts, in turn, can hinder or delay successful task completion. However, certain types of conflicts may also have beneficial effects. The literature differentiates between task conflicts (TCs) and relationship conflicts (RCs). Whether TCs are detrimental or beneficial for performance largely depends on the simultaneous occurrence of RCs. However, the reasons for the differential effects of TCs *with* and *without* RCs remain largely unknown. Therefore, we explored the underlying fine-grained mechanisms of the conflict-performance relationship in two studies. We used event-sampling methodology to track employees' conflicts in the field (study 1) and we examined conflicts in a controlled laboratory setting (study 2). We found that RCs during TCs made participants feel disrespected and thereby increased negative affect. Further, RCs during TCs impaired knowledge gain, which decreased positive affect. In turn, low positive affect explained why TCs with RCs led to poorer performance than TCs without RCs. However, neither of the two studies supported the assumption that high negative affect from RCs during TCs—by itself—had adverse effects on performance. Our results confirm previous findings of the destructive character of RCs during TCs and additionally provide new insights into the nature and complexity of workplace conflicts by introducing positive affect as a missing piece of the puzzle.

Keywords Relationship conflicts · Task conflicts · Event-sampling methodology · Experimental methodology · Performance · Well-being

Introduction

Even though interpersonal conflicts at work are undesirable, they are common aspects of work life (Pearson, Andersson, & Porath, 2000; Keenan & Newton, 1985; Narayanan, Menon, & Spector, 1999). According to an international survey of over 5000 employees in Europe and the USA performed by Consulting Psychologists Press Inc. (2008), 56% of German employees reported dealing with conflicts at the workplace "frequently" or "always." Conflicts have detrimental effects on employee health and well-being (e.g., Dijkstra, van Dierendonck, & Evers, 2005). These effects, in turn, may lead to absenteeism and reduced efficiency at work (see Riaz & Junaid, 2011), both of which may then impair organizational outcomes such as innovativeness or financial performance.

However, not all interpersonal conflicts are the same. Even though the everyday notion of conflict implies negative affect and major disputes, the term "conflict" actually covers a wide spectrum of incompatibilities between individuals. Conflicts range from mundane differences in opinion to extreme forms of verbal aggression and unrestrained acts of hostility. Whereas the latter should be avoided, the former may stimulate in-depth discussions and thorough decision-making and therefore should not necessarily be prevented and in some circumstances even be promoted. In order to narrow down the broad construct of conflicts, two main types of conflicts have been identified, namely, task conflicts (TCs) and relationship conflicts (RCs). TCs are defined as disagreements about a task or the best way to accomplish a task (e.g., Jehn, 1995; Jehn & Bendersky, 2003). RCs are

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more aligned with the commonly implied definition of the word "conflict", i.e., hostility and personal clashes (also see Hershcovis, 2011, for a compilation of similar definitions of the term "interpersonal conflict"). RCs arise from animosity and dislike among team members (e.g., Jehn, 1995; Jehn & Bendersky, 2003). Both types of conflicts negatively affect individuals' well-being (i.e., these conflicts evoke negative affect), but their cognitive and performance-related consequences notably differ. Whereas all studies that investigated RCs found that RCs have negative effects on performance (de Wit, Greer, & Jehn, 2012), some studies that investigated TCs found that TCs have positive effects on performance (e.g., Amason, 1996; Jehn & Mannix, 2001; Jehn & Chatman, 2000). Hence, the traditional view regarding the general pernicious nature of interpersonal conflicts can be considered outdated once TCs are differentiated from RCs.

However, this differentiation is challenging, and we cannot simply consider RCs "dysfunctional conflicts" that hinder task completion and project progress and TCs "functional conflicts" that support the aim of completing tasks and achieving the objectives of a project. Recent meta-analyses and reviews (Bradley, Anderson, Baur, & Klotz, 2015; de Wit et al., 2012; Loughry & Amason, 2014; O'Neill, Allen, & Hastings, 2013) have concluded that TCs usually have negative effects and only show positive effects under very specific circumstances. Thus, TCs are double-edged swords. The most intuitive explanation of TCs' duality is the fact that most studies reporting negative effects of TCs have also found high intercorrelations between TCs and RCs (e.g., Amason, 1996; Dijkstra et al., 2005; Simons & Peterson, 2000). Thus, the negative effects of TCs on performance may result from co-occurring RCs. Consistent with this reasoning, De Dreu and Weingart (2003) showed that TCs and performance were more positively associated in studies with weak correlations between TCs and RCs. Furthermore, Shaw et al. (2011) found that in teams reporting no or low interpersonal frictions and a trusting group climate, moderate levels of TCs improved performance (also see DeChurch, Mesmer-Magnus, & Doty, 2013; Jehn & Mannix, 2001 for a similar finding). These findings suggest that when team members feel comfortable discussing different points of view without interpreting opposing opinions as personal attacks, TCs may actually boost performance (also see Bradley et al., 2015). In contrast, when team members dislike each other, TCs are more likely to trigger RCs (Jehn, 1995; Simons & Peterson, 2000), which reduce performance. Consistent with this notion, O'Neill and colleagues (O'Neill, McLarnon, Hoffart, Woodley, & Allen, 2015) found that teams with high levels of TCs but low levels of RCs outperformed teams who experienced high or moderate levels of TCs combined with high or moderate levels of RCs over a 6-month period. Thus, TCs without RCs or with low levels of RCs (hereafter "pure TCs") seem to result in substantially better performance outcomes compared with TCs with moderate or high levels of RCs (hereafter "TCs with RCs"). The goal of our research was to replicate these findings while, in addition, taking a closer look at single conflict interactions among individuals to (1) clearly disentangle the antecedents and consequences of conflicts and to (2) reveal the underlying processes to obtain a better understanding of the larger picture behind the conflict-performance relationship.

Most research on the differential effects of pure TCs and TCs with RCs on performance is based on retrospective self-reports (see de Wit et al., 2012 for an overview), thereby limiting the conclusions that can be drawn due to the broad time frame of the assessment. That is, by simultaneously exploring the frequency of conflicts and measuring performance, it is impossible to disentangle aspects of the workplace climate from the consequences of conflict. For instance, it is plausible that workplaces with high levels of RCs differ from those with low levels of RCs concerning other stressors that also negatively affect performance. Further, using a typical cross-sectional design, it is impossible to extract individual differences from the conflict-performance relationship that may account for both more intense perceptions of hostilities during TCs and lower performance outcomes (for instance, depressive symptoms impair both relationship quality and performance; Adler et al., 2006; Coyne, Burchill, & Stiles, 1991). Event-sampling or experimental studies make it possible to disentangle such confounds and enable real-time assessments of the processes trigged by conflicts at the same time.

To the best of our knowledge, only one recent study has experimentally examined the differential effects of pure TCs and TCs with RCs on performance (study 2; de Wit, Jehn, & Scheepers, 2013). This study found that RCs impair information processing during TCs, explaining why poorer decisions are made during TCs with RCs than during pure TCs. The aim of our research was to extend the findings reported by de Wit and colleagues (de Wit et al., 2013) as follows: First, we aimed to assess whether RCs during TCs impair performance on tasks unrelated to the task during which the conflict took place. It is plausible to assume that the effects of conflicts linger on and influence *subsequent tasks*. Second, we aimed to investigate the *underlying fine-grained mechanisms* that may explain the differential effects of pure TCs and TCs with RCs on performance on subsequent tasks. For this, similar to de Wit and colleagues (de Wit et al., 2013), we adopted an individual-centered approach. As all individuals construct their own reality (e.g., Bono, Boles, Judge, & Lauver, 2002) and perceptions of the subjective reality drive affective and cognitive responses, we were only interested in reactions to events that were perceived as conflicts by the affected person. Using this approach, our design was simple and straightforward. First, we conducted an event-sampling study in which we assessed all conflicts experienced by the participants during five working days while also assessing

their daily performance at work. Here, we took special care to draw the line between TCs and RCs as precisely as possible. That is, we explained each conflict type in detail prior to the data collection period to guarantee nuanced measures that reflect the corresponding constructs with as little mutual overlap as possible. Second, we conducted an experimental study in which standardized TCs with and without RCs were induced, and their effects on performance were assessed. In both studies, we investigated dyadic conflict interactions.

Differential effects of pure TCs and TCs with RCs

Affective Events Theory (Weiss & Cropanzano, 1996) posits that work events (e.g., conflicts) are the causes for affective reactions at work. This theory builds on appraisal theories of emotion (e.g., Lazarus, 1991; Lazarus & Folkman, 1984) and explains how discrete events contribute to the emergence of affective states in a specific context: the workplace. Processes that take place during work events and outcomes of work events are evaluated in terms of goal relevance and goal congruence. Affective reactions are the consequences of these appraisal processes. That is, processes during work events or outcomes of work events have to be personally relevant in order to elicit emotions. Then, if relevance is confirmed, processes can either elicit positive or negative emotions depending on whether they obstruct or promote the attainment of goals. At work, the *achievement goal* (i.e., the desire to be competent or the "need for competence") represents a highly relevant basic goal whose attainment strongly relates to employee' well-being and overall functioning (see, e.g., Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010).

The achievement goal has an intra-individual and an inter-individual component (Nicholls, 1984). If you have achieved now more than in the past, you feel competent because you have extended your own skills or *gained knowledge.* In this case, the self at another point in time is used as reference for the evaluation of the own competence (intrapersonal comparison). If, however, you have achieved more than others with equal effort or the same as others with less effort, you feel competent because you have outperformed others and *gained respect*. Here, others serve as reference for the evaluation of the own competence (interpersonal comparison).

TCs both obstruct and promote the attainment of the achievement goal. On the interpersonal level, TCs in form of critical discussions pose a threat to the position or the status of employees in conflict (De Dreu & van Knippenberg, 2005). Even during a constructive discussion, one's expertise and, hence, parts of the self are likely to be rejected by the other person. This should be evaluated as unpleasant (as it hinders the attainment of the inter-individual component of the achievement goal to feel respected) and lead to negative affect. In contrast, on the intrapersonal level, TCs pose learning opportunities; that is, they enable individuals to expand their knowledge, as they get to know different points of view and learn about opposing arguments (e.g., Amason, 1996; Pelled, Eisenhardt, & Xin, 1999). This is likely to be evaluated as pleasant (as it aids the attainment of the intra-individual component of the achievement goal to gain knowledge) and to lead to positive affect. Hence, TCs should induce both negative and positive affect. Indeed, recently, Todorova, Bear, and Weingart (2014) found that TCs can be energizing and thus have the capacity to elicit positive affect. This is a beneficial effect of TCs, which is suggested to have important implications (e.g., "… Some of the negative emotional responses to conflict might be mitigated by a co-occurring positive emotional response …", Nixon, Bruk-Lee, & Spector, 2017, p. 131). Interestingly, this positive effect of TCs has largely been disregarded in the past.

However, to the extent to which RCs arise during TCs and transform pure TCs into TCs with RCs, positive affect should diminish and negative affect should increase. This is because RCs impair information processing and learning (see above) and hence hinder the attainment of the intra-individual component of the achievement goal. Thus, positive affect during TCs with RCs should be lower than during pure TCs. Further, RCs involve interpersonal tension and signal rejection not only of one's ideas but also of the whole person (of one's values, one's attitudes, and one's personality) and hence completely obstruct the attainment of the inter-individual component of the achievement goal. Thus, negative affect during TCs with RCs should be higher than during pure TCs.

Affective reactions to pure TCs or TCs with RCs should then linger on and influence performance on tasks unrelated to the task during which the conflict occurred (spill-over effects). Affective Events Theory (Weiss & Cropanzano, 1996) proposes that the composition of employees' affective reactions to workplace events predicts subsequent work behaviors. Hence, drawing on Affective Events Theory, we assumed that the interplay between positive and negative affect during TCs (with and without RCs) would predict post-conflict performance (i.e., attitudes towards co-workers and cognitive processing during subsequent work tasks). In the following, we will explain our assumptions in greater detail.

TCs and affect An opposition to one's ideas and arguments poses a threat to the self, leading to negative affect, as it signals rejection and disrespect (De Dreu & van Knippenberg, 2005). According to De Dreu and van Knippenberg (2005), the "possessive self" may explain why even pure TCs can have negative effects. Individuals' opinions are often deeply integrated with their identity and have become part of their self-representation. Consequently, when these opinions are questioned, individuals may react with anxiety to this threat.

That is, TCs may entail the risk of losing face (see also Meier, Gross, Spector, & Semmer, 2013).

However, whether TCs that are a threat to the self are still perceived as pure TCs remains questionable. It is plausible that pure TCs escalate into TCs with RCs when the threat to the self surpasses a certain threshold. Accordingly, TCs can be misattributed as RCs when the critique of a person's arguments is perceived as an attack on the self rather than a mere rejection of ideas (e.g., Simons & Peterson, 2000). Alternatively, RCs may arise during TCs when discussions become emotional and shift from task-related issues to personal issues. Interpersonal frictions unrelated to the task at hand threaten the fundamental goal of maintaining high social-esteem (e.g., belonging to a social network, see Semmer, Jacobshagen, Meier, & Elfering, 2007). Either way, discussants who *perceive* RCs during TCs (regardless of the actual presence of RCs) may feel disrespected, leading to a series of negative emotions (Blincoe & Harris, 2011). In contrast, discussants who do not perceive RCs during TCs (i.e., discussants who experience pure TCs) should feel relatively valued by others and, consequently, experience considerably less negative affect. In line with this assumption, using a daily diary approach, Meier et al. (2013) found that when the influence of RCs on TCs was controlled for, TCs were unrelated to negative affect such as anger.

Hypothesis 1a: During pure TCs, individuals will feel more respected and hence they will experience less negative affect than during TCs with RCs.

In addition to the negative pathway described above, discussions that involve diverging opinions (i.e., TCs) are stimulating and increase people's momentary arousal (Amason, 1996). New insight and information gained during such TCs can energize and activate employees (Todorova et al., 2014) by enabling learning and personal growth (Csikszentmihalyi, 2014). However, when RCs emerge during these TCs and transform pure TCs into TCs with RCs, information processing is impaired, and hence, learning and knowledge gain are thwarted (de Wit et al., 2013). Consequently, states of energetic concentration and pleasure (Csikszentmihalyi, 2014) are more likely to occur during pure TCs than during TCs with RCs.

Hypothesis 1b: During pure TCs, individuals will gain more knowledge and hence they will experience more positive affect than during TCs with RCs.

TCs and performance Anxiety and distress evoked by TCs (with RCs) should reduce both concentration and the processing of complex information (e.g., Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004; Eysenck, 1985; Reio & Callahan, 2004; Rodell & Judge, 2009). Furthermore, people who experience negative affect may lose sight of their original task (Jehn, 1997) and tend to perform worse in laboratory tasks and at work (Harris & Menzies, 1999; Smith et al., 2001). Consistent with these considerations, TCs have been found to impair performance (e.g., Lovelace, Shapiro, & Weingart, 2001). However, as outlined above, TCs also stimulate excitement and enthusiasm. This positive affect, in turn, motivates individuals to exert greater effort in a task, thereby improving performance (Rich, LePine, & Crawford, 2010). During both decision-making and creative problem-solving, individuals work more efficiently (Isen, Rosenzweig, & Young, 1991) and show superior performance (Isen, Daubman, & Nowicki, 1987) when positively aroused prior to the task. This result is consistent with findings showing that TCs are also associated with critical and creative thinking (De Dreu & West, 2001). Thus, TCs should lead to better post-conflict performance in the absence of RCs (i.e., during pure TCs) due to lower levels of negative affect and higher levels of positive affect.

Hypothesis 2: During pure TCs, individuals will experience less negative affect (*H2a*) and more positive affect (*H2b*) than during TCs with RCs and hence they will perform better after pure TCs than after TCs with RCs.

Method—study 1

In study 1, we examined the short-term consequences of pure TCs and TCs with RCs in a combined event- and experience-sampling study. During the workday, employees reported and evaluated all conflict interactions. In the evening of the same day, they evaluated their daily performance. Using this method, we gathered real-time information about conflicts and their immediate effects on positive and negative affect. The performance evaluations were temporally decoupled from the reports of conflicts to reduce bias due to halo effects (Loughry & Amason, 2014).

Participants

Participants were 165 full-time employees (97 women) with a mean age of 35.4 years ($SD = 9.68$ years). This sample size provides adequate power for detecting micro-level direct effects of small to medium effect sizes (Arend & Schäfer, 2017). Participants worked in various fields (from education and social services to IT and financial services) and positions. On average, they had 12.3 years ($SD = 10.7$ years) of work experience. All participants had colleagues and worked at least occasionally in teams. Participants were mainly recruited via the career network XING, online advertisements posted on Facebook or published in newsletters, and e-mails to companies. Study invitations included a link to a questionnaire that provided further study information. Interested employees who worked at least 30 hours per week, frequently experienced social interactions during work (i.e., at least five interactions with colleagues, clients, or supervisors per day) and could

answer short questionnaires during their work time were eligible to participate. In total, 38% of the persons who clicked on the initial link participated in the study. Participants were rewarded with personal feedback and a gift equivalent to €20 or €30 for their full participation. The study was conducted in accordance with the guidelines of the Declaration of Helsinki and approved by the Department's Ethics committee. Participants were aware that they had the right to discontinue participation at any time and that their responses were confidential.

Study design and procedure

After providing informed consent, participants provided their contact information to receive further correspondence and answered several general questions regarding their demographics and current occupation. Following these questions, they received extensive information regarding the study procedure, which also contained clear instructions regarding the type of interactions that should be reported. For this, task-related and relationship-related disagreements at work were defined, and examples were given to illustrate the difference between task-related and relationship-related disagreements. Disagreements had to occur at work exclusively on a professional basis, thus excluding visits or calls from friends or family members received at the office. Additionally, participants had to play an active part in the disagreement and could not only witness it. Participants were instructed to complete the questionnaire immediately and no more than 15 minutes after an interaction. Participants were asked to complete the questionnaire at least twice a day during work hours. They were instructed to focus on interactions during which they experienced disagreements, but they could also report on interactions without disagreements. We strongly encouraged participants to report all disagreements encountered during the workday, even if two surveys had already been completed. Comprehension questions in the form of a short questionnaire were asked to check whether participants correctly understood their tasks. Participants could only proceed if they gave the right answers to each of the questions (if this was not the case for one or more questions, they had to answer the corresponding question(s) again).

On Monday of the following week, the event-sampling part of the study started. Participants completed several short *daytime* questionnaires per day for a total of five workdays. Employees were contacted in the morning via e-mail to remind them of their daily task. Additionally, at approximately noon, a second e-mail reminder was sent. In the evening, participants completed an *evening* questionnaire regarding their daily performance. They were contacted via e-mail after work to remind them to complete the evening questionnaire. To ensure anonymity, participants received a code, which was attached to all questionnaires. The connection between the code and their e-mail addresses and telephone numbers was deleted as soon as participants were compensated. We limited our analyses to participants who completed at least 3 days of data collection. This resulted in a sample of 165 participants. Eighty-nine percent of these participants completed all 5 days of data collection. In total, we obtained 2227 daytime and 815 evening observations.

Measures

Daytime questionnaire

Given the time constraints employees face at work, it is common practice to use single-item measures in diary and particularly in event-sampling studies (Diebig, Bormann, & Rowold, 2017; Sonnentag, Binnewies, & Mojza, 2008). Hence, we followed this procedure and selected items with high item-total correlations that additionally had high face validity from validated scales. For this, first, an independent sample of 96 participants completed a questionnaire with the full-length original scales. Then, single items were chosen for the daytime questionnaire on the basis of the factor loadings (Stanton, Sinar, Balzer, & Smith, 2002). However, as selecting items only based on psychometric evidence may limit the content validity of single-item measures (Fisher, Matthews, & Gibbons, 2016), we additionally used expert judgments[1] and conceptual definitions to adapt the items and improve their comprehensibility and fit to the event-sampling methodology.

If no German translation of a questionnaire existed, the corresponding items were first translated from English to German and then back-translated to English to ensure equivalence of meaning (Hambleton & De Jong, 2003). Prior to the measures of interest, participants were asked to state whether they were currently at work and had recently interacted with colleagues, supervisors, subordinates, or clients in person or via e-mail, telephone, or chat.

Task conflicts (TCs) and relationship conflicts (RCs) were measured with two adapted items from the German version of Jehn's (1995) Conflict Scale by Lehmann-Willenbrock, Grohmann, and Kauffeld (2011). Participants reported whether the recent interaction involved a TC (e.g., "Did you experience disagreements with your interaction partner regarding the content or the implementation of the work being done?") and an RC (e.g., "Did you experience personal attacks during the interaction?"). If a TC, an RC, or both were present, participants additionally rated the intensity of the perceived conflict (from 1 = mild to 5 = intense). Similar to Todorova et al. (2014), we chose items that do not refer to affective changes within the conflict situation and instead focus on conflict behaviors. Further, to avoid potential problems with correctly identifying TCs in high-quality relationships (Loughry &

[1] We invited several researchers not involved in this study to evaluate the quality of the items and asked them for formulation suggestions.

Amason, 2014), we did not use items that included the negatively connoted word "conflict." Thus, in our study, in contrast to previous studies (e.g., summarized in Loughry & Amason, 2014), most (78%) of the experienced conflicts were pure TCs, and only 17% of the conflicts were TCs with RCs.

Feelings of respect To assess feelings of respect, we asked participants to indicate the extent to which they felt "well regarded" (one item from the Social Regard Questionnaire by Butcher, Sparks, & O'Callaghan, 2003). Similar single-item measures have been used in other studies (see, e.g., DeBono & Muraven, 2014; Porath & Erez, 2007). The response options ranged from 1 = not at all to 7 = very much.

Knowledge gain To assess knowledge gain, we asked participants to indicate the extent to which the interaction was "an educational experience" (one item from the Appraisal Scale by Searle & Auton, 2015). The response options ranged from 1 = not at all to 5 = very much.

Positive and negative affect were measured with the Momentary Affect Scale by Gee, Ballard, Yeo, and Neal (2012). Participants indicated how they felt using two bipolar scales ranging from − 5 = very relaxed, calm, composed, peaceful, comfortable (low negative affect) to + 5 = very nervous, tense, anxious, upset, stressed (high negative affect) and from − 5 = very sluggish, tired, sleepy, dull, bored (low positive affect) to + 5 = very awake, active, energetic, alert, bright (high positive affect).

Evening questionnaire

Performance The productivity scale of the Health and Work Questionnaire (HWQ) by Shikiar, Halpern, Rentz, and Khan (2004) was used to record daily performance. Participants responded to three items measuring the efficacy, quantity, and quality of their work (e.g., "How would you describe the quality of your work today?") on a response scale ranging from 1 = my worst ever to 10 = my best possible ($\alpha = .85$).

Data analysis

To test the predicted mediations, two separate two-level path analyses were conducted using Mplus 7.4 (Muthén & Muthén, 1998–2015). We tested the 1-1-1 multilevel mediation hypotheses using a multilevel structural equation modeling (MSEM) paradigm. Following Preacher, Zyphur, and Zhang (2010), we specified random intercepts and fixed slopes. We used Monte Carlo simulations to assess the significance of the indirect effects (Selig & Preacher, 2008). We do not report fit indices, as both models (see below) were fully identified.

Only reports that either described pure TCs or TCs with RCs were included in the analyses and coded either "0" (TCs with RCs) or "1" (pure TCs). We first investigated whether pure TCs were related to lower levels of negative affect and higher levels of positive affect compared with TCs with RCs as mediated by feelings of respect and knowledge gain. Then, we calculated the within-person ratio of pure TCs to all TCs (pure TCs and TCs with RCs) for each day and the averaged within-person level of positive and negative affect for each day to assess whether a higher rate of pure TCs to all TCs during the day was related to better daily performance as mediated by the average level of daily negative and positive affect. In both analyses, we did not make predictions about the direct effects of pure TCs and TCs with RCs on performance and concentrated on the hypothesized indirect effects.

Notably, in both analyses, we only had level 1 (within-person) predictors. Yet, whereas in the first analysis, level 1 was the *event*-level (i.e., multiple conflicts experienced during the day), in the second analysis, it was the *day*-level (i.e., the percentage of conflicts experienced in the course of one day, the averaged affect score, the daily performance rating). We conducted two separate mediation analyses instead of one serial mediation analysis because performance was measured only once a day. To examine the effects of both conflicts and affect on performance, we aggregated the predictor variables (conflict and affect) to the day-level. However, this procedure would not have been feasible for feelings of respect and knowledge gain because these evaluations highly fluctuate across situations as they largely depend on the nature of the conflict. Hence, aggregation would have eliminated a substantial amount of meaningful variance. Similar considerations could be applied to negative and positive affect. Yet, we suggest that even though employees' affect may differ across situations during the day, the average level of daily post-conflict affect should help to explain why performance within one individual is better on one day than on another day. However, this approach is very conservative, and we expected to find small rather than large effects in the second mediation analysis.

Results—study 1

Preliminary analyses

Correlations are presented in Table 1. Given the hierarchical nature of the data, we present both between-person (above the diagonal) and within-person (below the diagonal) correlations. Before testing the hypothesis, we investigated whether multilevel modeling was appropriate by examining within- and between-person variance in the outcome variables. Means and between-person as well as within-person variances are presented in Table 2. As shown in Table 2, most of the total

Table 1 Correlations between variables in study 1

	1	2	3	4	5	6
1. Pure TCs vs. TCs with RCs		.05	.34***	.20**	− .22***	.08
2. Knowledge gain	.13***		− .06	− .04	.17*	− .23**
3. Feelings of respect	.35***	.12***		.43***	− .60***	.21**
4. Positive affect	.23***	.19***	.21***		− .42***	.28***
5. Negative affect	− .35***	− .05*	− .54***	− .25***		− .12
6. Performance[a]	.12***	.13***	.10**	.22***	− .09**	

Correlations below the diagonal represent within-person scores ($n = 2227$ [[a] 815]). Correlations above the diagonal represent between-person scores ($N = 165$). *Pure TCs*, task conflicts without relationship conflicts; *TCs with RCs*, task conflicts with relationship conflicts. *$p < .05$; **$p < .01$; ***$p < .001$

variance was within individuals, but there was also a considerable proportion of variance between individuals (see "ICC1" column). This justifies applying multilevel modeling.

Hypothesis testing

The results of the path analyses are displayed in Fig. 1, and the indirect effects are shown in Table 3. As predicted (Hypothesis 1a), participants experienced less negative affect during pure TCs than during TCs with RCs, because they felt more respected during pure TCs than during TCs with RCs. Further, participants experienced more positive affect during pure TCs than during TCs with RCs, because they gained more knowledge during pure TCs than during TCs with RCs. This supports Hypothesis 1b. Moreover, participants' better performance during workdays on which they experienced more pure TCs than TCs with RCs over the course of the day was mediated by positive affect, supporting Hypothesis 2b. In contrast to our expectations, negative affect did not mediate the relationship between the proportion of pure TCs to all TCs and daily performance. Thus, Hypothesis 2a was not supported.[2] To rule out the alternative explanation that the higher intensity of TCs during TCs with RCs than during pure TCs drives the negative effects of TCs with RCs (e.g., Todorova et al., 2014; Tsai & Bendersky, 2016), we reran our analyses controlling for the intensity of TCs. The results of these control analyses (see Figure A and Table A in the supplementary materials) are similar to our initial results, and hence, the detrimental effects of RCs during TCs cannot be attributed to the fact that more intense TCs are more likely to be perceived as TCs with RCs rather than as pure TCs.

MSEM also models between-person effects. Although we did not make predictions about between-person effects, similar mediations emerged between-persons as within-persons: Employees who (over the course of the 5 days of data collection) experienced more pure TCs than TCs with RCs generally felt less negative affect, as mediated by overall feelings of respect (estimate = − 2.676 (.691), $CI_{95\%}$ = [− 4.121, − 1.364]). They also reported an overall better performance as mediated by overall positive affect (estimate = .715 (.373), $CI_{95\%}$ = [.061, 1.572]) but not by overall negative affect (estimate = − .058 (.297), $CI_{95\%}$ = [− .782, .543]). Yet, in contrast to the within-person effects, the significant total effect of the overall percentage of pure TCs (to all TCs) on overall positive affect (estimate = 3.218 (.949), $CI_{95\%}$ = [1.359, 5.077]) was not mediated by overall knowledge gain (estimate = − .021 (.124), $CI_{95\%}$ = [− .467, .292]).

Discussion—study 1

Consistent with our first hypothesis, study 1 revealed that feelings of respect acted as a mediator helping to explain why pure TCs were related to less negative affect than TCs with RCs. Further, knowledge gain acted as a mediator helping to explain why pure TCs were related to more positive affect than TCs with RCs. However, the results of study 1 only partially confirm our second hypothesis. Whereas positive

[2] We performed two additional path analyses in which we contrasted pure TCs with interactions without any conflicts to investigate the mere effects of pure TCs. Here, we also found that participants experienced more positive affect during pure TCs (than during interactions without conflicts) as mediated by knowledge gain (estimate = .069 (.027), $CI_{95\%}$ = [.021, .128]). Furthermore, participants performed better during pure TCs (than during interactions without conflicts) as mediated by positive affect (estimate = .020 (.011), $CI_{95\%}$ = [.002, .047]) but not as mediated by negative affect (estimate = .004 (.012), $CI_{95\%}$ = [− .018, .029]). However, participants experienced not only more positive affect but also more negative affect during pure TCs (than during interactions without conflicts) as mediated by feelings of respect (estimate = .496 (.074), $CI_{95\%}$ = [.362, .653]). This finding is unsurprising as during pure TCs, one's opinions and arguments are rejected, which lowers feelings of respect and increases stress. Yet, compared with TCs with RCs, individuals still feel relatively respected and relaxed during pure TCs.

Furthermore, we performed two additional path analyses in which we contrasted the absence and presence of TCs during RCs to investigate whether the amount of conflict may explain why TCs with RCs are "bad" conflicts in contrast to pure TCs. We found that pure RCs are more damaging than TCs with RCs as follows: Participants experienced more negative affect during pure RCs (compared with TCs with RCs) as mediated by feelings of respect (estimate = .244 (.134), $CI_{95\%}$ = [.002, .528]). Further, participants experienced less positive affect during pure RCs (than during TCs with RCs) as mediated by knowledge gain (estimate = − .392 (.141), $CI_{95\%}$ = [− .712, − .150]). Furthermore, pure RCs hindered performance more than TCs with RCs (estimate = − 1.434 (.329), $CI_{95\%}$ = [− 2.080, − 0.788]). However, neither negative nor positive affect acted as a mediator here. Hence, the amount of conflict was less essential for the conflict's consequences than the type of conflict.

Table 2 Multilevel summary statistics

	Mean	Between-person variance	Within-person variance	ICC1
Knowledge gain	2.79	.36	1.36	.22
Feelings of respect	4.76	.61	1.74	.26
Positive affect	6.81	1.63	4.78	.26
Negative affect	4.81	1.19	5.93	.17
Performance[a]	7.16	1.10	1.67	.40

$N = 165$ participants at level 2 and $n = 2227$ [[a] 815] observations at level 1

affect acted as a mediator and, hence, helped to explain why pure TCs led to better performance than TCs with RCs, negative affect did not mediate the relationship of TCs with performance. Initially, this finding may be surprising as the sphere of influence of negative affect is often considered wider than the sphere of influence of positive affect (Weiss & Cropanzano, 1996). Negative affect distracts employees from work tasks, which lowers performance outcomes. Employees are consumed by feelings of hurt, which then triggers a desire for revenge, rumination, or withdrawal. Regardless of the exact reaction, negative affect should take up resources in people's working memory that are needed for task completion and hence impair performance. However, negative affect or acute stress may also facilitate working memory and improve certain types of performance (Schwarz & Bless, 1991; Yuen et al., 2009). Negative affect fosters systematic processing, which helps people to focus on details and to complete complex tasks. These opposing effects may balance each other such that negative affect may not be as detrimental as often assumed (see, for instance, the meta-analysis by Baas, De Dreu, & Nijstad, 2008).

Another explanation for why negative affect did not affect performance relates to the way we conceptualized *positive* and *negative* affect. Our scale contrasted the high-arousal *positive* state (attentive) with the low-arousal *negative* state (sluggish) and the high-arousal *negative* state (stressed) with the low-arousal *positive* state (relaxed) (see Gee et al., 2012). We found that when participants felt more attentive than sluggish, they performed better. However, when participants felt more stressed than relaxed, they performed neither worse nor better. Hence, relaxation and distress may have had similar effects on performance (see Orlić, Grahek, & Radović, 2014), and a difference score may have undermined their unique effects.

A third explanation for the null effects of negative affect on performance may be the way we conceptualized and measured performance. In study 1, performance was conceptualized as daily productivity and measured after work to reduce halo error by temporally separating the measurement of performance from the evaluation of the conflicts. However, this method allowed for neither a comprehensive assessment of performance nor a clear separation of the performance on

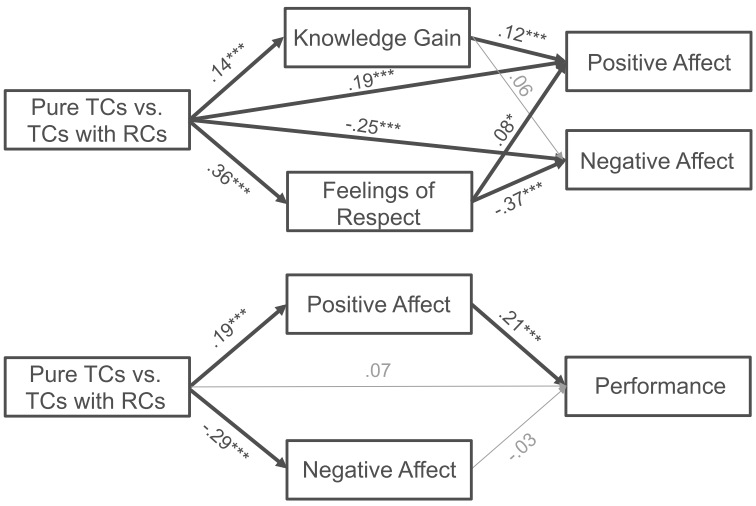

Fig. 1 Overview of results from model 1 and model 2 in study 1. Coefficients are standardized. Sample size varies slightly between models due to missing data. Pure TCs, task conflicts without relationship conflicts; TCs with RCs, task conflicts with relationship conflicts. *$p < .05$; **$p < .01$; ***$p < .001$

Table 3 Total and indirect effects on affect (model 1) and performance (model 2)—study 1

Relationship	Total effect		Mediator	Indirect effect	
	Estimate	$CI_{95\%}$ (LL, UL)		Estimate	$CI_{95\%}$ (LL, UL)
Model 1—affect					
Positive affect—pure TCs vs. TCs with RCs	*1.466 (.218)*	[1.039, 1.892]	Knowledge gain	*.105 (.034)*	[.044, .180]
			Feelings of respect	*.170 (.069)*	[.039, .311]
Negative affect—pure TCs vs. TCs with RCs	*− 2.357 (.196)*	[− 2.741, − 1.974]	Knowledge gain	.050 (.029)	[− .007, .111]
			Feelings of respect	*− .847 (.124)*	[− 1.106, − .619]
Model 2—performance					
Daily performance—pure TCs vs. TCs with RCs	*.466 (.187)*	[.099, .833]	Positive affect	*.156 (.058)*	[.054, .287]
			Negative affect	.036 (.049)	[− .060, .138]

Reported total and indirect effects are unstandardized coefficients, as they are based on unstandardized regression coefficients (please see Selig & Preacher, 2008). We report standard errors in parentheses next to the estimates. 95% confidence intervals were calculated with the Monte Carlo method to assess significance of indirect effects. Significant effects are marked in italics. *$CI_{95\%}$*, 95% confidence interval; *pure TCs*, task conflicts without relationship conflicts; *TCs with RCs*, task conflicts with relationship conflicts

the tasks during which the conflict occurred from the performance on post-conflict tasks.

We sought to address these limitations in study 2. To gain a more detailed picture of how conflicts evoke negative affect and whether this negative affect, in turn, influences performance, we used a unipolar scale for measuring positive and negative affect in our second study. Further, we investigated different types of (objective) performance measures clearly unrelated to the conflict itself. Job performance has traditionally been defined as an employee's effectiveness in performing a task (Borman & Motowidlo, 1993). However, Borman and Motowidlo (1993) emphasize the importance of contextual behaviors, i.e., behaviors that enhance the organizational environment, such as helping colleagues (i.e., organizational citizenship behaviors; see Rotundo & Sackett, 2002). Hence, in study 2, we divided performance into task performance and contextual performance, and both performance dimensions were measured after the end of the conflict scenario. Following Porath and Erez (2007), task performance was further subdivided into problem-solving and innovation to assess both convergent thinking (i.e., the search for one correct answer for a problem) and divergent thinking (i.e., the generation of new perspectives and new ideas for a problem). We expected similar indirect effects for contextual performance as for task performance: Negative affect leads to avoidance behavior (e.g., Carver & Harmon-Jones, 2009), thus limiting contextual performance (i.e., prosocial and other citizenship behaviors; Rodell & Judge, 2009). In contrast, individuals high in positive affect engage in behaviors that foster a positive social environment among team members, leading to better contextual performance (Rich et al., 2010; Rodell & Judge, 2009). Hence, we assumed that pure TCs would lead to better contextual performance than TCs with RCs as mediated by negative and positive affect.

The final possible shortcoming of study 1 is that only correlational support, but not causal support, was provided for the relationships among type of conflict, affect, and performance. Although daily conflict experiences should shape daily affect, the direction of the relationship is not well-known. Positive affect may also buffer, whereas negative affect may intensify conflict experiences (e.g., Girardi et al., 2015). Similarly, even though conflicts influence performance, teams that perform well may also perceive less relationship conflict (see Loughry & Amason, 2014). Thus, in our second study, participants experienced a standardized laboratory conflict, and we measured its effects on subsequent affect and performance outcomes while controlling for baseline affect.

Method—study 2

Participants

Assuming small to moderate relationships between independent variables, mediators, and dependent variables, we estimated a sample size of 140 participants to test indirect effects with a power of .80 and a confidence level of 95% (Schoemann, Boulton, & Short, 2017). Hence, a total of 143 participants (95 women) were recruited via the participant database at the Humboldt-Universität zu Berlin (Psychologischer Experimental-Server Adlershof), the career network XING, and posters at local companies. One participant decided to discontinue participation. Thus, data from 142 participants (95 women) with a mean age of 40.2 years (*SD* = 11.9 years) were included in the analyses. Participants were employees (i.e., non-students) with an average of 17.3 years (*SD* = 12.6 years) of work experience, working at least 15 hours per week (*M* = 34.1 hours, *SD* = 9.78 hours) in various

fields and positions. All were native speakers of German. Participants took part individually and received €20 to €30 depending on the actual duration of the 2-to-3-hour laboratory session. The same ethical standards as those outlined in study 1 were applied.

Procedure

At least 24 hours prior to the laboratory session, participants completed an online questionnaire measuring demographics and measures not relevant to this study. During the laboratory session, after providing informed consent, participants answered questions regarding their momentary affect and performed the conflict task (see below). After the conflict task, participants evaluated the presence and level of perceived TC and RC and rated the degree to which they felt respected and the extent to which the [conflict] task helped them to gain knowledge. Additionally, they reported on their momentary affect and, following Porath and Erez (2007), they completed two task performance tests (divergent and convergent thinking) and one contextual performance/helpfulness test (prosocial behavior). Finally, after participants had completed all post-experimental questions, they were fully debriefed and carefully probed for suspicion regarding the existence of their interaction partner. Less than 15% of the participants uncovered that the video statements by their interaction partners had been prerecorded.

Conflict task

Two conflict scenarios were designed: one to elicit pure TCs and one to elicit TCs with RCs. Participants were randomly assigned to one of the two conditions ($n_{pure\_TC} = 71$, $n_{TC\_RC} = 71$). During the conflict task, participants discussed the implementation of an organizational measure with (simulated) interaction partners. Participants chose one of two topics for the discussion: (1) improvements to the catering service at the company canteen (such as more diverse food selections or vegetarian-friendly food options) or (2) improvements to organizational family-friendliness (such as the implementation of company childcare or the conversion of one full-time position into two part-time positions). The task consisted of two blocks, i.e., one block during which participants discussed the content of an organizational measure and another block during which they discussed the precise implementation of the measure. For each discussion point, participants were offered three to four response options. Once an option was chosen, participants were asked to explain their choice in a video statement. A random choice was simulated such that participants always started the discussion. Based on their response choice, they received a corresponding video statement from interaction partners who argued against their choice. In the "pure TC" condition, the simulated interaction partner remained friendly throughout but firmly disagreed with all the task-related choices participants made. In contrast, in the "TC with RC" condition, the simulated interaction partner behaved in a way that created an additional RC. In this condition, exactly the same arguments were used to disagree with the participants' choices, but the arguments were offered harshly without reassuring smiles.

Stimulus material For the video recordings of the simulated interaction partner, actors were filmed in a laboratory room resembling the one where the experiment took place. Four actors (two men, two women) were filmed. One male and one female actor improvised speech content based on specific keywords provided, which assured that the same arguments were presented each time. At least ten takes were recorded per required video statement, and those takes fitting the predefined criteria best (similarity in content and length but substantial differences in friendly attitude between conditions) were then transcribed for the other male and female actor to ensure that their videos were similar in strength of argumentation and word choice. The final set of video statements (160) was shown to 35 raters (18 women and 17 men) with a mean age of 26.5 years ($SD = 7.04$ years) blind to the aim of the study; these individuals rated the authenticity (i.e., believability) of each actor, the persuasive power of their arguments, and the pleasantness of the atmosphere within each video statement. All actors were found to be equally believable, largest difference in authenticity between actors, $M_{diff} = .06$, $t(34) = .81$, $p = .42$, Cohen's $d = .14$,[3] and across all actors, conditions differed with respect to atmosphere, $M_{diff} = 4.27$, $t(34) = 35.25$, $p < .001$, Cohen's $d = 5.96$, but not with respect to the quality of the arguments, $M_{diff} = .01$, $t(34) = .37$, $p = .71$, Cohen's $d = .06$.[4] A second pretest involving 23 participants with a mean age of 31.4 years ($SD = 14.9$ years) who completed the conflict task (7 women and 5 men in the "pure TC" condition and 6 women and 5 men in the "TC with RC" condition) further confirmed that (a) the task clearly evokes a TC,[5] $M = 91\%$, $t(22) = 15.2$, $p < .001$, Cohen's $d = 6.48$, and that (b) the expected perceived differences in RC[5] between the conditions emerged, $M_{diff} = 58\%$, $t(18) = 3.41$, $p = .003$, Cohen's $d = 1.42$.

[3] The TOST procedure (Lakens, 2016) indicated that the observed effect size was significantly within the equivalence bounds of a medium effect size (Cohen's $d = -0.5$ and Cohen's $d = 0.5$), $t(34) = 2.16$, $p = .019$.

[4] The TOST procedure (Lakens, 2016) indicated that the observed effect size was significantly within the equivalence bounds of a medium effect size (Cohen's $d = -0.5$ and Cohen's $d = 0.5$), $t(34) = 2.61$, $p = .007$.

[5] We adapted the German version of Jehn's (1995) conflict scale by Lehmann-Willenbrock et al. (2011) to suit the laboratory setting. Specifically, we asked about the presence or absence of conflicts (e.g., "Did you experience disagreements with your interaction partner regarding the content of the work being done?"), and, if conflicts were present, participants were asked to rate the intensity rather than the frequency of conflicts (e.g., "How intense were these disagreements with your interaction partner?"), on a 6-point response scale (from 1 = mild to 6 = intense).

Measures

All measures (unless stated otherwise) used response options from 1 = strongly agree to 7 = strongly disagree. If no German translation of a questionnaire existed, corresponding items were first translated from English to German and then back-translated to English to ensure equivalence of meaning (Hambleton & De Jong, 2003).

Positive and negative affect To measure negative affect, participants rated the degree to which they felt "tense", "stressed", "annoyed", and "irritated" (pre-conflict rating: $\alpha = .69$; post-conflict rating: $\alpha = .89$). To measure positive affect, participants rated the degree to which they felt "energetic", "joyful", "active", and "attentive" (pre-conflict rating: $\alpha = .74$; post-conflict rating: $\alpha = .76$). To reduce the participants' awareness of our interest in their positive and negative affect, we embedded these relevant items in a questionnaire that supposedly measured physical sensation relevant to a laboratory task (e.g., warm cheeks, tense muscles; see Hess & Blairy, 2001).

Task conflict (TC) and relationship conflict (RC) were measured with a full-length adapted German version of Jehn's (1995) Conflict Scale by Lehmann-Willenbrock et al. (2011) (see the second pretest for the stimulus material, TC: $\alpha = .83$, RC: $\alpha = .96$).

Feelings of respect and knowledge gain To measure feelings of respect, participants rated the extent to which they felt "well regarded", "taken seriously", and "disrespected" with an adapted version of the Social Regard Questionnaire by Butcher et al. (2003) ($\alpha = .91$). To measure knowledge gain, participants reported whether the [conflict] task was an "educational experience" that helped them "to learn a lot" (shortened version of the Appraisal Scale by Searle & Auton, 2015; $\alpha = .74$). The response options ranged from 1 = strongly disagree to 5 = strongly agree.

Performance

Divergent thinking was assessed with Guilford's Unusual Uses test and scored using the Snapshot scoring method (Silvia et al., 2008; Silvia, Martin, & Nusbaum, 2009). For this, raters look at all of the responses participants gave and assign a single holistic creativity score (inter-rater reliability across four raters: $\alpha = .82$) based on the remoteness, novelty, and cleverness of the response. Guilford's Unusual Uses test requires participants to generate unusual uses for a common household object, such as a wire coat hanger. Participants were given a blank paper sheet and allowed 3 minutes to work on this task.

Convergent thinking was measured with 15 items from the German version of the Compound Remote Associate (CRA) task (Landmann et al., 2014). In the CRA task, participants were required to find a noun that fits three unrelated stimulus nouns in such a way that three meaningful compound nouns emerge. For example, they were shown the three stimulus nouns MAGAZINE-TITLE-WEB and then had to find the word PAGE, a word that fits to all of the three stimulus nouns (practice item). Participants were allowed to work on the riddles for 8 minutes but could also stop at any time.

Prosocial behavior was assessed with the Tangram (Help/Hurt) Task (Saleem, Anderson, & Barlett, 2015) as an index of contextual performance. During the Tangram Task, participants had to assign puzzles to their interaction partner. Their task was to select 11 out of 30 puzzles across three levels of difficulty: 10 easy, 10 medium, and 10 hard puzzles. Participants were told that their interaction partners would win a prize if they manage to complete all 11 tangrams within 10 minutes, but they would receive nothing if they fail. The number of selected easy puzzles counted as an index of prosocial behavior. To reduce suspicion, participants were told that, because the random number generator chose them to start the discussion, they were now in the lucky position to *only* assign and *not* complete the puzzles.

Data analysis

The same analysis procedure as for study 1 was used. The only difference was that in study 1, we needed to model our data on two levels, and in study 2, all data were modeled on one level. In all paths that included negative or positive affect, baseline affect was controlled. We used bias-corrected bootstrapping to assess the significance of the total and indirect effects. We do not report fit indices, as both models were fully identified.

Results—study 2

Manipulation check

Our conflict manipulation was successful, as most participants experienced a TC in the "pure TC" condition ($M = 93\%$, $t(70) = 35.4$, $p < .001$, Cohen's $d = 8.46$) and all participants experienced a TC in the "TC with RC" condition ($M = 100\%$). Furthermore, participants experienced an RC significantly more often in the "TC with RC" condition, $M = 100\%$, compared with the "pure TC" condition, $M = 37\%$, $M_{diff} = 63\%$, $t(70) = 11.0$, $p < .001$, Cohen's $d = 1.85$, and the intensity of the experienced RC was significantly higher in the "TC with RC" condition, $M = 4.46$, compared with the "pure TC"

condition, $M = .70$, $M_{diff} = 3.76$, $t(115) = 19.0$, $p < .001$, Cohen's $d = 3.19$.

Preliminary analyses

As expected, participants in the "pure TC" condition reported higher feelings of respect, $M_{diff} = 3.50$, $t(124) = 18.17$, $p < .001$, Cohen's $d = 3.07$, and more knowledge gain, $M_{diff} = .50$, $t(134) = 2.76$, $p = .007$, Cohen's $d = .46$, than participants in the "TC with RC" condition. Further, participants in the "pure TC" condition experienced significantly lower negative affect,[6] $M_{diff} = -1.40$, $t(101) = -6.53$, $p < .001$, Cohen's $d = -1.10$, and higher positive affect,[6] $M_{diff} = .40$, $t(126) = 2.60$, $p = .011$, Cohen's $d = .44$, and performed significantly better on the convergent thinking, $M_{diff} = .97$, $t(138) = 1.97$, $p = .050$, Cohen's $d = .33$, the divergent thinking, $M_{diff} = .36$, $t(138) = 2.80$, $p = .006$, Cohen's $d = .47$, and the prosocial behavior test, $M_{diff} = 1.37$, $t(134) = 2.71$, $p = .008$, Cohen's $d = .46$, than participants in the "TC with RC" condition. Means, standard deviations, and correlations of all variables are presented in Table 4.

Hypothesis testing

The results of the path analyses[7] are displayed in Fig. 2 and the indirect effects are shown in Table 5. The lower level of negative affect during pure TCs compared with that during TCs with RCs was mediated by feelings of respect. This finding supports Hypothesis 1a. Further, the higher level of positive affect during pure TCs than during TCs with RCs was mediated by knowledge gain, lending support to Hypothesis 1b. Moreover, participants' better performance after pure TCs than after TCs with RCs was mediated by positive affect. Thus, Hypothesis 2b was also supported. However, negative affect again did not predict any of the performance outcomes. Hence, no significant indirect effect of pure TCs on performance through negative affect emerged. Thus, Hypothesis 2a was not supported.

General discussion

We conducted two studies, i.e., a field study and a laboratory study, to explore the mediating mechanisms of the effects of TCs on performance as a function of the level of simultaneously occurring RCs. Drawing on Affective Events Theory (Weiss & Cropanzano, 1996), which transfers appraisal theories of emotion (e.g., Lazarus, 1991; Lazarus & Folkman, 1984) to the workplace, we proposed that employees would evaluate outcomes of both pure TCs (i.e., TCs without RCs) and TCs with RCs based on their congruence with their work goals, which, in turn, would explain the affective reactions that come along with TCs. Goal congruence is perceived as pleasant, leading to positive affect and goal incongruence is perceived as unpleasant, leading to negative affect. As TCs hinder the attainment of the inter-individual component of the achievement goal to feel *respected* (goal *in*congruence) and promote the attainment of the intra-individual component of the achievement goal to *gain knowledge* (goal congruence), we predicted that TCs would elicit *negative* as well as *positive affect*. Moreover, we proposed negative affect to be higher during TCs with RCs than during pure TCs due to a higher *in*congruence between the desire to feel respected and the actually perceived respect during TCs with RCs than during pure TCs. Similarly, we proposed positive affect to be lower during TCs with RCs than during pure TCs due to a lower congruence between the desire to gain knowledge and the actually perceived knowledge gain during TCs with RCs than during pure TCs. Finally, we predicted that both affective states would explain the effects of pure TCs compared with TCs with RCs on *performance*.

The findings across both studies are consistent, highlighting the validity of our results. In line with previous research, pure TCs elicited less negative affect and, expanding upon previous findings, also elicited more positive affect than TCs with RCs. As hypothesized, this difference in affect between participants who experienced pure TCs and those who experienced TCs with RCs was mediated by a difference in feelings of respect and knowledge gain. Further, confirming previous research, pure TCs were associated with better performance than TCs with RCs. Yet, this difference in performance between pure TCs and TCs with RCs was mediated by the difference in positive—but not in negative—affect between pure TCs and TCs with RCs. Hence, our findings suggest that measuring the experience of positive affect is at least as important as measuring the experience of negative affect in response to TCs.

In contrast to most research on workplace conflicts, which has used a cross-sectional design based on retrospective self-reports (see de Wit et al., 2012 for an overview), our studies used both an event-sampling and an experimental approach. Hence, we were able to examine the short-term effects of workplace conflicts involving appraisals and affective changes, which are processes that contribute to the fine-grained mechanism of the conflict-job performance relationship. This approach allowed us to extend previous findings (de Wit et al., 2013) showing that the level of RCs during TCs determines the performance-related consequences of TCs on different types of performance measures that were partially (study 1) or entirely (study 2) unrelated to the conflict situation. Whereas de Wit and colleagues (de Wit et al., 2013) only examined TCs' effects on decision-making, we investigated

[6] Prior to the analysis, we performed a baseline correction.

[7] As control analyses (in which we eliminated the participants who reported suspicion that they were not interacting with a real person) increased rather than decreased the size of the coefficients, we decided to use a more conservative approach and report the results based on all participants.

Table 4 Means (*M*), standard deviations (*SD*), and correlations between variables in study 2

	M	*SD*	1	2	3	4	5	6	7	8	9
1. Pure TCs vs. TCs with RCs	.50	.50									
2. Knowledge gain	3.43	1.10	.23**								
3. Feelings of respect	4.25	2.09	.84***	.29**							
4. Baseline positive affect	4.86	.94	− .04	.22**	.11						
5. Positive affect	4.96	1.09	.14	.29**	.28**	.58***					
6. Baseline negative affect	1.93	.88	.10	− .08	− .08	− .47***	− .27**				
7. Negative affect	2.32	1.42	− .42***	− .13	− .56***	− .26**	− .40***	.28**			
8. Convergent thinking	4.83	2.93	.17*	.11	.21*	− .01	.27**	− .05	− .06		
9. Divergent thinking	2.81	.78	.23**	.20*	.16	.03	.22**	.07	− .21*	.18*	
10. Prosocial behavior	6.59	3.06	.21*	− .07	.24**	− .11	.19*	.07	− .10	.29**	.15

*$p < .05$; **$p < .01$; ***$p < .001$. *Pure TCs*, task conflicts without relationship conflicts; *TCs with RCs*, task conflicts with relationship conflicts

TCs' effects on daily productivity, convergent thinking, divergent thinking, and prosocial behaviors. Further, as mentioned above, we introduced an important mediator that had been recently suggested to play a major role in the course of TCs (Todorova et al., 2014) but to date remains under-researched, i.e., positive affect. Supporting our assumptions, the present findings show that RCs during TCs not only intensified negative affect but also reduced the level of positive affect because RCs during TCs hinder learning and knowledge gain. Then, again, the lower the positive affect, the more detrimental the effects of TCs with RCs on performance.

Different facets of negative affect

One surprising finding was the lack of effects of negative affect on performance based on different methods in both studies. We believe that these findings may stem from the inherent complexity of negative affect. Specifically, negative affect entails avoidance-motivated emotions, such as anxiety, that are detrimental to concentration-based tasks as they inhibit cognitive functioning and promote avoidance behaviors (Carver & Harmon-Jones, 2009; Drevets & Raichle, 1998). However, negative affect also includes anger, which is an approach-motivated emotion. Unfair criticism and hostility, especially during TCs with RCs, can be appraised as unjustified offenses, leading to a desire to defend oneself against the offending partner, thus leading to anger (e.g., Andersson & Pearson, 1999; see also Baumeister, Smart, & Boden, 1996; Blascovich & Mendes, 2010; Lazarus, 1999; Porath & Erez, 2007). Anger has been traditionally considered a destructive force, as it is closely related to aggression and hostility and leads to counterproductive work behaviors (e.g., Fox &

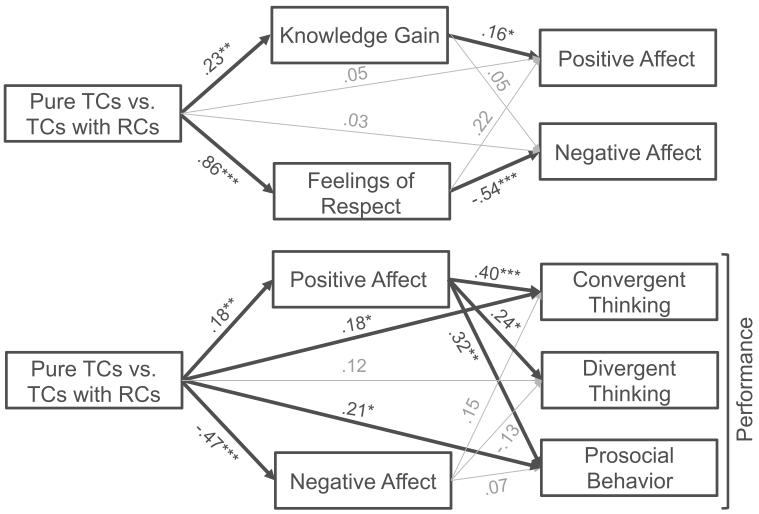

Fig. 2 Overview of results from model 1 and model 2 in study 2. Coefficients are standardized. Sample size varies slightly between models due to missing data. Pure TCs, task conflicts without relationship conflicts; TCs with RCs, task conflicts with relationship conflicts. *$p < .05$; **$p < .01$; ***$p < .001$

Table 5 Total and indirect effects on affect (model 1) and performance (model 2)—study 2

Relationship	Total effect		Mediator	Indirect effect	
	Estimate	$CI_{95\%}$ (LL, UL)		Estimate	$CI_{95\%}$ (LL, UL)
Model 1—affect					
Positive affect—pure TCs vs. TCs with RCs	*.175*	[.037, .297]	Knowledge gain	*.035*	[.003, .098]
			Feelings of respect	.190	[− .017, .423]
Negative affect—pure TCs vs. TCs with RCs	*− .473*	[− .572, − .361]	Knowledge gain	.012	[− .021, .059]
			Feelings of respect	*− .460*	[− .691, − .238]
Model 2—performance					
Convergent thinking—pure TCs vs. TCs with RCs	*.179*	[.012, .336]	Positive affect	*.069*	[.018, .142]
			Negative affect	− .071	[− .168, .021]
Divergent thinking—pure TCs vs. TCs with RCs	*.221*	[.063, .375]	Positive affect	*.042*	[.004, .120]
			Negative affect	.062	[− .031, .170]
Prosocial behavior—pure TCs vs. TCs with RCs	*.228*	[.066, .378]	Positive affect	*.056*	[.013, .128]
			Negative affect	− .034	[− .129, .064]

Reported total and indirect effects are standardized coefficients. Bias-corrected 95% bootstrapping confidence intervals were calculated to assess significance of total and indirect effects. Significant effects are marked in italics. *$CI_{95\%}$*, 95% confidence interval; *pure TCs*, task conflicts without relationship conflicts; *TCs with RCs*, task conflicts with relationship conflicts

Spector, 1999). Yet, as anger signals competence and strength because angry individuals show the will to correct perceived injustice, positive aspects of anger have also been discussed (see Hess, 2014). This idea is supported by findings from laboratory studies showing that TCs that evolve into RCs can be appraised as challenging (Frisch, 2012) and can evoke anger as an energizing force (Boge, 2011). Further, similar to positive affect, anger mobilizes energy and focuses attention (Frijda, 1986; Roseman, Wiest, & Swartz, 1994).

Attributions of personal control, confidence, and certainty that accompany anger (Fischhoff, Gonzalez, Lerner, & Small, 2005; Lerner & Keltner, 2001; Lerner, Gonzalez, Small, & Fischhoff, 2003; Lerner & Tiedens, 2006) can increase effective thinking and persistence in handling challenging tasks (Bandura, 1994). In this vein, Averill (1982) argues that anger may lead to problem-solving, and Mendes, Major, McCoy, and Blascovich (2008) found that anger resulting from discrimination leads to better performance in a word-finding task. If the facets of negative affect linked to anxiety have impaired task performance while facets of negative affect linked to anger have improved task performance (Byron & Khazanchi, 2011; Reio & Callahan, 2004), the result could have been a null effect.

Similarly, the complexity of negative affect may have resulted in a null effect on contextual performance. Angry individuals tend to mistrust and blame others for their negative feelings (Dunn & Schweitzer, 2005; Keltner, Ellsworth, & Edwards, 1993), and angry individuals become selfish, competitive, stereotypic, and punitive (Bodenhausen, Sheppard, & Kramer, 1994; Lerner, Goldberg, & Tetlock, 1998; Van Kleef, De Dreu, & Manstead, 2010). Hence, anger should have a negative effect on contextual behaviors, especially with regard to an interaction partner with whom one experienced a conflict. However, simultaneously, anxiety can have the opposite effect. Individuals who have been socially excluded often behave in a way that enhances the likelihood of reaffiliation (such as offering help to others) if the opportunity of reconnection exists (Bernstein, 2016). Similarly, intimidated and frightened individuals who have suffered losses in their social self-esteem may attempt to boost this social self-esteem to its normal level by behaving in a friendly manner and hoping for friendliness in return. Thus, the potential positive effects of anxiety on contextual performance may have counteracted the negative effects of anger on contextual performance, leading to an inconclusive total effect of negative affect on contextual performance. Therefore, future research should depart from the traditional assessment of positive and negative affect and assess discrete emotions instead.

Strengths and limitations

The present research provides important insights into the mechanisms by which conflicts at work can help or hinder performance and well-being in terms of positive and negative affect. The strong coherence of findings across the very different designs suggests that the mechanisms revealed here are relevant for a wide range of conflict situations.

Nevertheless, our studies also have several limitations. In study 1, due to the time constraints inherent to event-sampling studies in the field, we used single items to measure all constructs during the working day. Consequently, we could neither calculate the reliability of the measures nor conduct a confirmatory factor analysis to examine the discriminate

validity of the measures. Yet, it is a common procedure to shorten scales in diary studies and even more so in event-sampling studies (Diebig et al., 2017; Sonnentag et al., 2008). Further, single-item measures often do not have inferior psychometric properties compared with their corresponding multiple-item measures, especially if the constructs are unidimensional and unambiguous (e.g., Elo, Leppänen, & Jahkola, 2003; Robins, Hendin, & Trzesniewski, 2001; Sackett & Larson, 1990; Wanous, Reichers, & Hudy, 1997). Hence, we followed the recommendations of a recent study (Fisher et al., 2016) and carefully selected—as well as pretested—all our single-item measures with an independent sample of 96 participants prior to the data collection of study 1. Since we could replicate central findings from study 1 in study 2 using full-length scales, the items we chose for the single-item measures seemed to have captured the constructs well.

Further, we used self-reports to measure both conflict and performance evaluations in study 1. Thus, our results could be inflated due to halo error stemming from common method variance. It would have been preferable to use an objective measure (as we did in study 2) or a different source (i.e., the rating of a supervisor) to measure performance. However, objective performance tests produce valid results only under controlled conditions. Further, to observe the participants' daily performance fluctuations, supervisors would have needed to have a very close connection to the participants, which would have limited the generalizability of our findings. Hence, in study 1, we chose a different method to counteract potential bias due to halo error: We constructed a time lag between conflict and performance measurements.

In study 2, we did not manipulate the presence versus absence of TCs. TCs were held constant, and only the level of RCs was varied. Hence, we could not test whether TCs facilitate performance over the absence of any conflicts. Further, we could not examine whether RCs are more or less damaging when TCs are absent than when they are present. Yet, a convincing TC *absent* condition, similar in length and complexity to our TC *present* conditions, is hard to conceive. It would have been awkward to interact with someone who always agrees and simply repeats the participants' arguments. Moreover, we designed study 2 on the basis of our results from study 1, which show that TCs indeed improve performance in contrast to situations with no conflicts and that RCs are less damaging when TCs occur simultaneously (see footnote 2).

Practical implications and conclusion

Due to shifts in organizational structures and higher demands for complexity and interactivity over the last decades, teamwork has become unavoidable. Hence, workplace conflicts are ubiquitous, and it is thus necessary to gain a deeper understanding of the processes involved in conflicts and their influence on individuals' performance and organizations' productivity. Our results highlight the importance of positive affect. RCs during TCs reduce positive affect, which in turn harms performance. Importantly, even though RCs during TCs also produce stress, this alone is not a determining factor for the harmful effects of TCs with RCs on performance.

Our findings confirm previous research highlighting the importance of early interventions to prevent RCs from developing during TCs. Further, our findings extend previous research as they help to identify underlying mechanisms that explain the destructive nature of RCs during TCs. RCs turn TCs—which, in the real world, cannot and should not be entirely avoided—into disruptive discussions that deprive attendees of their energy and leave behind exhausted employees who are unable to behave appropriately towards others or complete assigned work tasks. In this sense, the negative effects of TCs depend on the extent to which the conflict parties' attentiveness and alertness suffer from perceptions of hostilities during these TCs. Hence, RCs during TCs should be prevented or at least mitigated to ensure a constructive and fruitful task-related discussion with positive affective, cognitive, and social consequences.

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Compliance with ethical standards

All procedures performed in the two studies were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the studies.

Conflict of interest The authors declare that they have no conflict of interest.

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A Real-time Assessment of Conflicts–Supplemental Material

This appendix provides supplementary material for the manuscript *Measuring task conflicts as they occur: A real-time assessment of task conflicts and their immediate affective, cognitive and social consequences* by Heidi Mauersberger, Ursula Hess and Annekatrin Hoppe.

Table A

Total and Indirect Effects on Affect (Model 1) and Performance (Model 2) Controlled for Task Conflict Intensity – Study 1

Relationship	Total effect		Mediator	Indirect effect	
	Estimate	$CI_{95\%}$ (LL, UL)		Estimate	$CI_{95\%}$ (LL, UL)
Model 1 – Affect					
Positive affect- pure TCs vs. TCs with RCs	**1.636 (.209)**	[1.226, 2.045]	Knowledge gain	**.103 (.034)**	[.044, .177]
			Feelings of respect	**.225 (.063)**	[.106, .354]
Negative affect- pure TCs vs. TCs with RCs	**-1.972 (.174)**	[-2.312, -1.631]	Knowledge gain	.044 (.027)	[-.023, .150]
			Feelings of respect	**-.646 (.107)**	[-.873, -.452]
Model 2 – Performance					
Daily performance- pure TCs vs. TCs with RCs	**.531(.195)**	[.148, .914]	Positive affect	**.155 (.056)**	[.056, .277]
			Negative affect	.069 (.047)	[-.017, .170]

Note. Reported total and indirect effects are unstandardized coefficients, as they are based on unstandardized regression coefficients (please see Selig & Preacher, 2008). We report standard errors in parentheses next to the estimates. 95% confidence intervals were calculated with the Monte Carlo method to assess significance of indirect effects. Significant effects are marked in bold. $CI_{95\%}$= 95% confidence interval. Pure TCs = Task conflicts without relationship conflicts. TCs with RCs = Task conflicts with relationship conflicts.

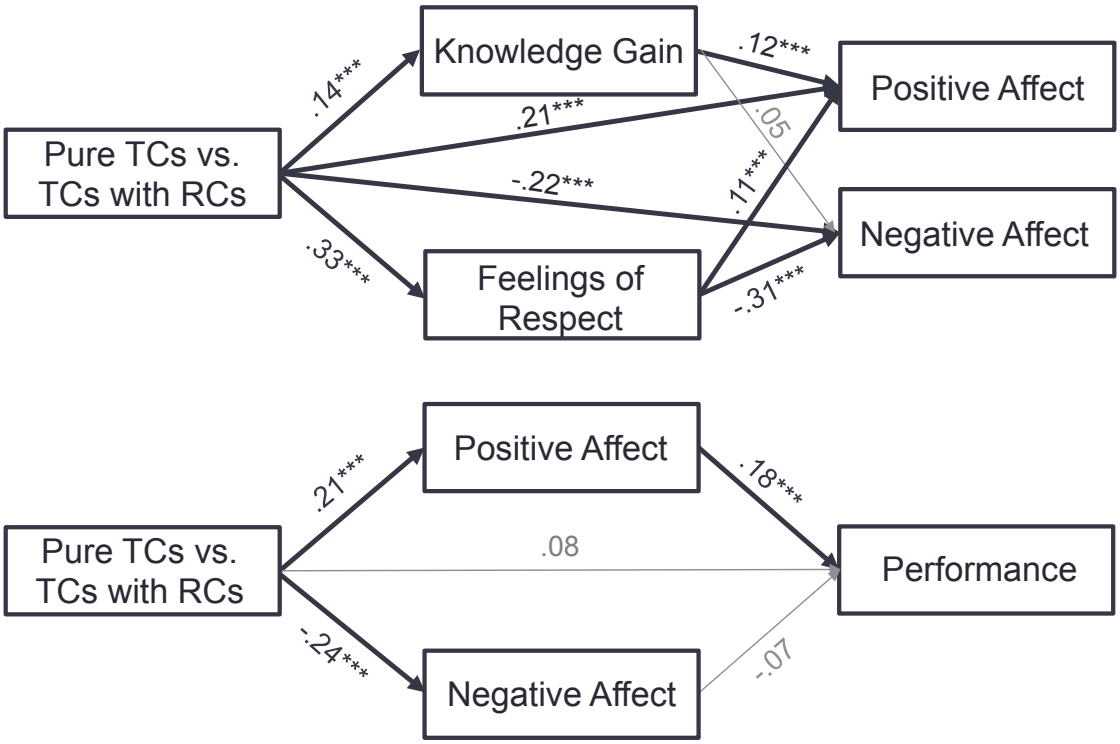

Figure A. Overview of results from model 1 and model 2 in Study 1, controlled for task conflict intensity. Coefficients are standardized. Sample size varies slightly between models due to missing data. Pure TCs = Task conflicts without relationship conflicts. TCs with RCs = Task conflicts with relationship conflicts. *$p < .05$. **$p < .01$. ***$p < .001$.

Appendix B: Manuscript 2

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ORIGINAL PAPER

When smiling back helps and scowling back hurts: individual differences in emotional mimicry are associated with self-reported interaction quality during conflict interactions

Heidi Mauersberger[1] · **Ursula Hess**[1]

Abstract
Conflicts or disagreements during which negative, antagonistic emotions are expressed are perceived as uncomfortable. By contrast, disagreements accompanied by positive, affiliative emotions are less detrimental to interaction quality. We assessed whether individual differences in emotional mimicry have differential effects on interaction quality during disagreements with negative emotions compared to disagreements with positive emotions. For this, participants talked with someone who disagreed with them in a controlled laboratory setting, while emotional mimicry was assessed via facial EMG. The interaction partner showed either an antagonistic or an affiliative demeanor during the interaction. Following the interaction, participants reported on perceived interaction quality. In line with the Emotional Mimicry in Context view (Hess and Fischer in Pers Social Psychol Rev 17:142–157, 2013), emotional mimicry decreased interaction quality when the person who disagreed showed an antagonistic demeanor but increased interaction quality when the person who disagreed showed an affiliative demeanor. Furthermore, implicit affiliation motivation predicted emotional mimicry regardless the context.

Keywords Conflicts · Disagreements · Antagonistic emotions · Affiliative emotions · Emotional mimicry · Implicit affiliation motivation

Introduction

Disagreements or conflicts are unavoidable between people who interact with each other in more than the most superficial manner. In the context of workplace interactions, conflicts have generally been described as harmful to employees, but also for the organization as a whole (de Wit et al. 2012; Spector and Bruk-Lee 2008). Yet, not all types of conflicts are detrimental under all circumstances (e.g., Bradley et al. 2015). This raises the question of what exactly differentiates "good" from "bad" conflicts? One answer lies in the emotional tone of the conflict. What starts out as a simple disagreement about a task often escalates into emotional conflicts (e.g., Jehn 1995; Jehn and Bendersky 2003) including attacks, insults and dismissive attitudes. These elements of an emotional conflict create a non-affiliative affective tone (Jehn 1995). Consequently, such conflicts impair well-being and social interaction quality. By contrast, disagreements without such antagonistic behaviors do not necessarily have negative effects and can even have positive effects (e.g., Bradley et al. 2015).

Yet, not only the demeanor shown by the interaction partners should be of relevance but also the reaction of the respective other interaction partner. In this research we focused on the effect of automatic facial reactions—that is, emotional mimicry—on perceived interaction quality during disagreements.

Mimicry and interaction quality

We focused on emotional mimicry because the act of imitating interaction partners' emotions fulfills a key social regulation function (Fischer and Hess 2017; Hess and Fischer 2013, 2014). Specifically, emotional mimicry fosters liking and affiliative intent between interaction partners (e.g., Stel

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et al. 2008; Van der Schalk et al. 2011; Yabar and Hess 2007). For this reason it "has been considered one of the cornerstones of successful and warm interactions" (Fischer and Hess 2016, p. 2). Conversely, some level of liking or affiliative intent is necessary for emotional mimicry to be observed. In this vein, Hess and Fischer (2013, 2014) concluded, based on a review of the literature, that people mimic others' emotions more in contexts where participants have positive rather than negative attitudes towards each other, are similar rather than dissimilar, belong to the same rather than to a different group (Bourgeois and Hess 2008; Van der Schalk et al. 2011; Weisbuch and Ambady 2008), or cooperate rather than compete with each other (Lanzetta and Englis 1989). Thus, mimicry is more likely shown in contexts that invite affiliation than in contexts that are antagonistic. Conflicts are another example for a potentially antagonistic context.

Yet, even in antagonistic contexts, matching facial expressions may be shown. Elfenbein (2014) presented a taxonomy of situations that elicit matching expressions. For example, the antagonistic emotions of one person may lead to affect contagion, or alternatively, the other person may react emotionally by showing antagonism as response to the perceived antagonism of the other. Such reactions should not be properly called mimicry, as they are elicited by a different process. However, as Hess and Fischer (2013) note, they can be very difficult to distinguish from mimicry. In the context of the present research, we will refer to matching antagonistic expressions as *antagonistic* mimicry and to matching affiliative expressions as *affiliative* mimicry.

Whereas affiliative mimicry should have positive effects on indices of interaction quality, antagonistic mimicry should be related to feelings of mutual misunderstanding during conversations as well as to lower satisfaction during social interactions in general (Mauersberger et al. 2015; also see Kurzius and Borkenau 2015, for similar effects of mimicry of negative in contrast to positive behaviors). With regard to disagreements this means that in the absence of antagonistic, emotional conflicts, interaction partners should engage in mimicry, which in turn should foster rapport. To the degree that interaction partners mimic each other, the perceived quality of the interaction should be positive even though the two disagree. In contrast, during antagonistic, emotional conflicts, mimicry should generally be absent or even be reversed (i.e., counter-mimicry such as laughter in response to a rejecting other) to successfully cope with personal offences and to limit negative feelings during conflict interactions. Yet, as outlined above, some individuals should nonetheless show antagonistic mimicry. This is, however, in our view a dysfunctional strategy that counteracts the human tendency to turn away from those who do not want to affiliate. Consequently, antagonistic mimicry should result in a worsening of the interaction quality. The *first aim* of the present study was therefore to investigate whether the effects of mimicry on interaction quality during conflicts differ as a function of the level of antagonistic conflicts.

Implicit affiliation motivation and mimicry

As outlined above, mimicry generally requires the desire to affiliate with interaction partners. This desire depends on the affiliative affordances of the context, but also on the needs and goals of potential mimickers. One proximal individual difference that has often been proposed but never been empirically examined as an antecedent of mimicry is an individual's *implicit affiliation motivation* (i.e., the extent to which people desire friendly interpersonal relationships; McClelland 1985; see e.g., Hess and Fischer 2016).

Implicit motives are activated by nonverbal cues such as emotional facial expressions (Schultheiss and Hale 2007; faces signaling both *high* and *low* affiliation function as incentives for observer's implicit affiliation motive, see also Stanton et al. 2010) and are captured best by nondeclarative behavioral measures (e.g., Biernat 1989; Brunstein and Hoyer 2002; Schultheiss and Brunstein 2010), as they are not accessible via self-report. It is further possible to distinguish between two facets of the affiliation motive—an approach component (i.e., hope for affiliation) and an avoidance component (i.e., fear of rejection) (Sokolowski and Heckhausen 2008; Weinberger et al. 2010). Approach and avoidance components are hypothesized to be distinct and relatively independent of each other (Gable 2006; Sokolowski and Heckhausen 2008). Approach affiliation motivates people to move towards desired social outcomes (e.g., social bonds) by devoting special attention to affiliative signals. In contrast, avoidance affiliation motivates people to avoid undesired social outcomes (e.g., social rejection) by devoting special attention to rejecting signals. Hence, affiliative emotions should trigger affiliative mimicry in individuals with a strong implicit approach affiliation motive in order to reciprocate affiliation. By contrast, antagonistic emotions should trigger antagonistic mimicry in individuals with a strong implicit avoidance affiliation motive as an emotional reaction to the perceived rejection. The *second aim* of the present study was therefore to examine whether both affiliative and antagonistic mimicry are associated with a high level of implicit affiliation motivation and whether the two components of implicit affiliation motivation have differential predictive power depending on whether or not antagonistic conflicts are present during the conflict interaction.

The present study

The present study had the aims to investigate whether the level of mimicry during conflict interactions (a) is associated with perceived interaction quality during conflict situations

and (b) depends on the strength of an individual's implicit affiliation motivation. For this, we measured mimicry during a standardized laboratory task conflict using facial electromyography (EMG) and asked participants to report on perceived interaction quality following the conflict interaction. Two types of conflict were employed. Affiliative conflicts were operationalized as task disagreements during which a simulated interaction partner (see below) consistently showed positive emotions and an affiliative demeanor. During antagonistic conflicts, the simulated interaction partner expressed the same level of task disagreement but showed negative emotions (i.e., anger) and an antagonistic demeanor. Prior to the laboratory session, we assessed participants' implicit desire for warm and friendly relationships.

Based on the reasoning outlined above, we predicted (H1) that the affiliativeness of the context moderates the impact of mimicry on perceived interaction quality. Specifically, during antagonistic conflicts, mimicry should result in reduced interaction quality, whereas during affiliative conflicts, mimicry should increase interaction quality. Further, we predicted (H2) that the extent to which individuals engage in mimicry depends on their implicit affiliation motivation. Individuals high in implicit affiliation motivation should show more mimicry than those low in implicit affiliation motivation. Additionally, we predicted (H3) a moderating effect of the type of conflict for the association between the two components of implicit affiliation motivation with mimicry. Specifically, we expected a stronger relationship between implicit *approach* affiliation motivation and mimicry during affiliative conflicts than during antagonistic conflicts. Conversely, we predicted a stronger relationship between implicit *avoidance* affiliation motivation and mimicry during antagonistic conflicts than during affiliative conflicts.

Method

Participants

A total of 143 participants (95 women) were recruited via the participant database at the Humboldt-Universität zu Berlin, the career network XING and posters at local companies. Data from eight participants (5.6%) were lost due to equipment malfunction or problems with the EMG electrode placement and data from three participants (2.1%) were excluded from analysis because of excessive EMG artifacts, mainly due to coughing and sneezing. One participant (0.7%) decided to discontinue participation. Thus, data from 131 participants (89 women; $M_{age} = 39.9$ years, $SD_{age} = 12.0$ years) were included in the analyses. Participants were employees (i.e., non-students) working at least 15 h per week in various fields and positions. All were native German speakers.

The study was conducted in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Ethics committee. Participants were aware that they had the right to discontinue participation at any time and that their responses were confidential. They participated individually and received €20 to €30 depending on the actual duration of the 2–3 h laboratory session.

Study design and procedure

At least 24 h prior to the laboratory session, participants completed an online questionnaire assessing demographics as well as implicit and explicit affiliation motivation. Due to a clerical error (two participants confirmed completion of the questionnaire but no data could be matched to their code), online questionnaire data from two participants were missing.

In the laboratory, after providing informed consent, participants reclined in a comfortable chair while physiological sensors were attached. The experimenter then left the room and participants watched a relaxing video showing water lapping at a beach in the sunset during which EMG baseline measures were taken. Subsequently, they experienced a conflict interaction during which facial EMG was recorded to assess mimicry. Two validated conflict scenarios were used: One to elicit antagonistic and one to elicit affiliative conflicts. Conditions were randomly assigned to participants ($n_{antagonistic} = 66$, $n_{affiliative} = 65$). Following the conflict interaction, participants completed several questionnaires to measure manipulation success and affect among other constructs not relevant for the present research question (see supplementary materials for a listing of additional measures reported in Mauersberger et al. 2018) and they answered post-experimental questions regarding the perceived interaction quality during the conflict interaction. Finally, electrodes were detached, participants were fully debriefed and all outstanding questions were answered by the investigator.

Conflict interaction

During the conflict interaction, participants were asked to discuss the implementation of an organizational measure with another "participant" via a video chat. Participants always interacted with an interaction partner of the same sex. Participants first chose one of two topics for the discussion: (1) improvements to the catering service at the company canteen (such as more diverse food selections or vegetarian-friendly food options) or (2) improvements to organizational family-friendliness (such as a company childcare or the conversion of one full-time position into two part-time positions). The conflict interaction consisted of two blocks—the first block involved discussing the content

of the organizational measure and the second block involved discussing the implementation of the measure. The discussion was guided by asking participants to first answer several questions using predetermined response options. Once an option was chosen, participants explained their choice in a video statement. Based on their response choice, they received a compatible video statement from interaction partners who argued against their choice.

In fact, all statements by the supposed discussion partner were video-recorded in advance. In the affiliative conflict condition, the simulated interaction partner remained friendly throughout the conflict interaction and frequently smiled at the participant during the video messages. Smiling was used to convey affiliative intent (Knutson 1996). In contrast, in the antagonistic conflict condition, the simulated interaction partner was unfriendly and frowned most of the time during the video messages. Importantly, the same arguments were used in both conflict situations—what differed was the nonverbal behavior of the interaction partner. That the demeanor had the intended effect was established in a pretest (see below). Each interaction consisted of seven exchanges. That is, participants saw seven videos of approximately 30 s length.

Stimulus material

For the video recordings of the simulated interaction partner, actors were filmed in a laboratory room resembling the one where the experiment took place. Four actors (two men, two women) were filmed with multiple takes for each statement. The video-taped interaction partners wore electrodes as did the participants. Facial EMG for the video-taped interaction partners was recorded and served for the assessment of mimicry (see below).

The final set of video statements (160) was shown to 35 raters (18 women; $M_{age} = 26.5$ years, $SD_{age} = 7.04$ years) blind to the aim of the study; these individuals rated the authenticity (i.e., believability) of each actor, the persuasive power of their arguments and the pleasantness of the interaction partner's demeanor (i.e., affiliativeness) for each video statement. All actors were found to be equally believable, largest difference $M_{diff} = .057$, $t(34) = 0.81$, $p = .42$, $CI_{95\%} = [-.086, .200]$, Cohen's $d = 0.14$,[1] and across all actors, conditions differed in perceived affiliativeness, $M_{diff} = 4.27$, $t(34) = 35.25$, $p < .001$, $CI_{95\%} = [4.02, 4.51]$, Cohen's $d = 5.96$, but not with respect to the quality of arguments, $M_{diff} = .006$, $t(34) = 0.37$, $p = .71$, $CI_{95\%} = [-.026, .037]$, Cohen's $d = 0.06$.[2] A second pretest, involving 23 participants (13 women; $M_{age} = 31.4$ years, $SD_{age} = 14.9$ years), further confirmed that participants perceived more emotional conflict in the antagonistic conflict condition than in the affiliative conflict condition, $M_{diff} = 58\%$, $t(18) = 3.41$, $p = .003$, $CI_{95\%} = [22\%, 93\%]$, Cohen's $d = 1.42$. This was measured using an adapted German version of Jehn's (1995) conflict scale by Lehmann-Willenbrock et al. (2011) to suit the laboratory setting.

Measures

Affiliation motivation

We measured both implicit and explicit affiliation motivation.

Implicit affiliation motivation was assessed with the Picture Story Exercise (Schultheiss and Pang 2007). Participants were instructed to write imaginary stories based on pictures of ambiguous interpersonal situations. The picture set consisted of four pictures that were chosen with view to their high "pull" for affiliation themes: "Park bench" (a couple sitting on a bench by a river), "Nightclub" (a man and a woman seated at a table and drinking beer), "Excluded boy" (children talking while an unhappy-looking boy stands apart) and "Excluded girl" (children talking while an unhappy-looking girl stands apart with armed crossed). These pictures have been used in previous studies (see Wirth and Schultheiss 2006, for a description of the cue properties and a notification about the original source). Each picture was presented for 10 s. Participants had a maximum of 5 min to write their stories. After 4 min and 40 s, they were reminded that time will be up soon and they should finish their story now and move on to the next picture. Participants were not allowed to move on before 4 min had elapsed. Picture order was randomized for each participant.

The stories were coded for motivational imagery with two different scoring systems. Winter's (1994) *Manual for Scoring Motive Imagery in Running Text* was used to score overall implicit affiliation motivation and Heyns et al. (1958) system was used to score the approach and avoidance component of the implicit affiliation motivation (see Wirth and Schultheiss 2006). Scoring was conducted by a trained scorer who was blind to condition and mimicry scores. In addition, a subset of the stories was coded by a second

[1] The TOST procedure (Lakens 2016) indicated that the observed effect size was significantly within the equivalence bounds of a medium effect size (of Cohen's $d = -0.5$ and Cohen's $d = 0.5$), $t(34) = 2.16$, $p = .019$.

[2] The TOST procedure (Lakens 2016) indicated that the observed effect size was significantly within the equivalence bounds of a medium effect size (of Cohen's $d = -0.5$ and Cohen's $d = 0.5$), $t(34) = 2.61$, $p = .007$.

scorer who obtained high agreement with the first scorer (*ICC*(2,1) = .93). Both scorers had exceeded 85% agreement on calibration materials pre-scored by experts. Data from one participant had to be excluded due to nonsensical stories, which we rated as noncompliance.

Explicit affiliation motivation was measured with the three items of the short scale of the Unified Motive Scales (UMS-3) by Schönbrodt and Gerstenberg (2012).[3] Participants indicated whether it is important to them to engage in a lot of activities with other people on a 6-point response scale ranging from 1 = *not important to me* to 6 = *extremely important to me* (one item), whether they try to be in the company of friends as much as possible, and whether encounters with other people make them happy on a 6-point response scale ranging from 1 = *strongly disagree* to 6 = *strongly agree* (two items; Cronbach's α = .83).

Facial EMG

Mimicry was assessed using facial EMG. For this, EMG activity was measured for both the video-taped interaction partners and the participants. Using bipolar placements of Easycap GmbH Ag/AgCl miniature surface electrodes filled with Signa gel by Parker Laboratories Inc., the following sites were measured on the left side of the face: the *Corrugator Supercilii* (frown), the *Orbicularis Oculi* (wrinkles around the eyes) and the *Zygomaticus Major* (lifting the corners of the mouth in a smile).[4] The skin was cleansed with lemon prep peeling and 70% alcohol. Electrodes were placed according to the Guidelines published in Psychophysiology (Fridlund and Cacioppo 1986) and impedances were below 30 kΩ. Raw EMG data were sampled using a mindware bioamplifier with a 50 Hz notch filter at 1000 Hz. The signals were band pass filtered between 30 and 300 Hz (see, e.g., Hess 2009).

EMG data preparation The EMG data were offline rectified. All video records were inspected for movements such as yawning, coughing or sneezing, which cause artifacts. Time frames corresponding to such movements were set missing and excluded from further analyses. We then smoothed the signal by averaging over 3 s epochs; this resulted in a total of approximately 80 epochs. Epochs were baseline corrected by substracting the baseline from each epoch. The resulting difference scores were within-subject and within-muscle z-transformed. We then combined the data from the three muscles to create an antagonism index. This was done by substracting the mean of the Zygomaticus Major and Orbicularis Oculi from the Corrugator Supercilii activity. When this index is positive, it corresponds to a pattern of increased frowning and decreased smiling. The converse is the case for a negative value of the index. We included activity of the Orbicularis Oculi because activity of this muscle indexes the crow-feet wrinkles around the eye, often referred to as *Duchenne* marker. This marker is considered to be present in so-called "felt" as opposed to "social" smiles (Ekman and Friesen 1982). Even though ample research shows that many "social" smiles are in fact "Duchenne smiles" (e.g., Hess and Bourgeois 2010, who assessed mimicry in dyadic interactions using EMG), it remains the case that (at least in Western cultures) smiles that lack these markers are perceived as less authentic (Thibault et al. 2012). Thus, a negative antagonism index indicated that the expresser showed an overall smiling affiliative demeanor, whereas a positive antagonism index indicated an overall frowning antagonistic demeanor.

To assess mimicry, the antagonism indices of participant and interaction partner were correlated. The higher the correlation, the more congruent was the expression shown by both across the interaction. Correlations were z-transformed using Fisher's r to z-transformation.

Manipulation check

The German version of Jehn's (1995) conflict scale by Lehmann-Willenbrock et al. (2011) was adapted to the laboratory setting to measure the experience of emotional conflicts. Specifically, we asked for the presence of conflicts during the conflict interaction and if present, participants were asked to rate the intensity of (task and) emotional conflicts (e.g., "How intense were these interpersonal tensions between you and your interaction partner?"; Cronbach's α = .96) on a 6-point response scale (from 1 = *mild* to 6 = *intense*).

Affect

We embedded items measuring positive and negative affect in a questionnaire that supposedly measured physical sensation relevant to a laboratory task (e.g., eyes hurting, tense muscles, see Hess and Blairy 2001). Participants rated the degree to which they felt tense, stressed, irritated, annoyed (negative affect; Cronbach's α = .90), energetic, joyful, active and attentive (positive affect; Cronbach's α = .78) while simultaneously answering several distractor items on a 7-point response scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*.

[3] To reduce participants' suspicion, we also collected all the other explicit motives, which, however, will not be further discussed here.

[4] To increase feelings of similarity to video-taped interaction partners, we also placed electrodes on participants' forehead to measure *Frontalis* (lifting the eyebrows) activity even though those measures were not relevant for the present research question.

Perceived interaction quality during the conflict interaction

Participants rated their overall pleasure during the conflict interaction, the warmth of the atmosphere, the liking of their interaction partner and of the idea of working together again, the perceived (positive and negative) stance of their interaction partner and the feeling of being liked and understood during the conflict interaction on a 7-point response scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The 13 items (see supplementary materials for a complete listing) were combined into a single scale (Cronbach's α = .97), which reflects the perceived quality of the interaction. Due to equipment malfunction, data from two participants was lost.

Results

Analysis plan

First, as a manipulation check, we conducted an independent samples *t* test on the items of the conflict scale to investigate whether participants perceived more emotional conflict during antagonistic compared to affiliative conflicts. To verify that the video-taped interaction partners showed a more antagonistic demeanor during antagonistic conflicts, we compared their mean antagonism indices between conditions (with an independent samples *t* test).

Second, preliminary analyses were conducted to assess the effect of conflict demeanor on mimicry. For this, we first conducted one sample *t* tests against zero to make sure that mimicry took place in both conditions and then compared the level of mimicry during affiliative versus antagonistic conflicts (with an independent samples *t* test). We also verified that the level of implicit approach affiliation motivation assessed prior to the interaction did not differ between conflict conditions (with an independent samples *t* test).

Third, we tested our hypotheses. Specifically to test H1, that mimicry has a differential effect on perceived interaction quality depending on the conflict condition, we regressed perceived interaction quality on the mean centered correlations representing mimicry, the dummy-coded mean centered condition contrast and the interaction between mean centered mimicry and the dummy-coded mean centered condition contrast. To examine whether general affiliation motivation and the two components of affiliation motivation predicted mimicry and whether this effect differed as a function of condition (H2, H3), we regressed mimicry on mean centered implicit affiliation motivation, the dummy-coded mean centered condition contrast and the interaction between mean centered implicit affiliation motivation and the dummy-coded mean centered condition contrast. The implicit affiliation motivation scores were residualized for the total number of words with linear regression prior to regression analyses. The final part of the "Results" section consists of control analyses. Specifically, we rerun our main analyses with a number of control variables (see below). Our analysis plan is visualized in Fig. 1.

Manipulation check

Participants reported significantly more emotional conflicts during antagonistic than during affiliative conflicts, $M_{diff} = 57\%$, $t(67) = 12.0$, $p < .001$, $CI_{95\%} = [47\%, 66\%]$, Cohen's $d = 2.10$. Moreover, emotional conflicts during antagonistic conflicts were experienced as significantly more intense than during affiliative conflicts, $M_{diff} = 3.82$, $t(113) = 19.5$, $p < .001$, $CI_{95\%} = [3.43, 4.21]$, Cohen's $d = 3.41$. Further, video-taped interaction partners showed a significantly more antagonistic demeanor during antagonistic than during affiliative conflicts, $M_{diff} = 2.24$, $t(117) = 61.7$, $p < .001$, $CI_{95\%} = [2.17, 2.31]$, Cohen's $d = 10.8$. As expected, this effect was based on increased activation of Corrugator Supercilii versus decreased activation of Orbicularis Oculi and Zygomaticus Major in the antagonistic conflict condition and increased activation of Orbicularis Oculi and Zygomaticus Major versus decreased activation of Corrugator Supercilii in the affiliative conflict condition (see Fig. 2). Thus, if participants showed mimicry during antagonistic conflicts, this implies that they also showed an antagonistic expression. By contrast, mimicry during affiliative conflicts implies an affiliative, smiling demeanor.

Preliminary analyses

Mimicry

As predicted, mimicry was found for both conflict conditions (antagonistic mimicry: $M = .098$, $t(65) = 3.15$, $p = .002$, $CI_{95\%} = [.036, .161]$, Cohen's $d = 0.39$; affiliative mimicry: $M = .24$, $t(64) = 7.54$, $p < .001$, $CI_{95\%} = [.18, .30]$, Cohen's $d = 0.94$), but was significantly reduced during antagonistic conflicts compared to the affiliative conflicts, $M_{diff} = -.14$, $t(129) = -3.17$, $p = .002$, $CI_{95\%} = [-.23, -.05]$, Cohen's $d = 0.55$.

Implicit affiliation motivation

Participants in the two conditions did not differ significantly regarding their implicit affiliation motivation, $M_{diff} = 0.19$, $t(126) = 0.38$, $p = .71$, $CI_{95\%} = [-0.80, 1.17]$, Cohen's $d = 0.07$, nor did they differ significantly in their implicit approach affiliation motivation, $M_{diff} = 0.14$, $t(126) = 0.33$, $p = .74$, $CI_{95\%} = [-0.70, 0.98]$, Cohen's $d = 0.06$, or in their implicit avoidance affiliation motivation, $M_{diff} = -0.11$,

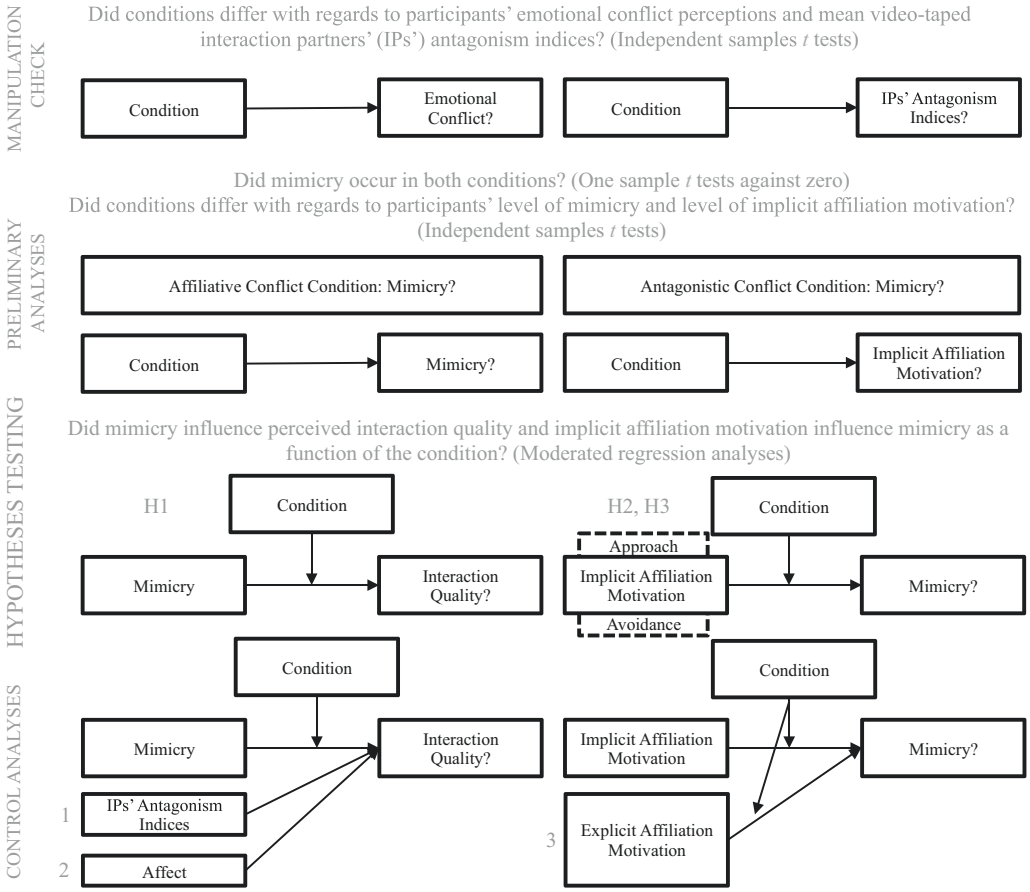

Fig. 1 Analysis plan

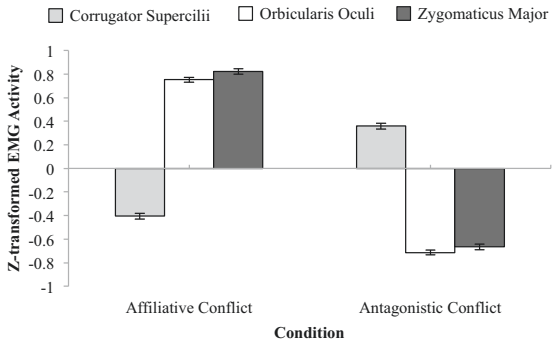

Fig. 2 Video-taped interaction partners' mean EMG activity as a function of muscle site (Corrugator Supercilii vs. Orbicularis Oculi vs. Zygomaticus Major) and condition (affiliative vs. antagonistic conflict). Error bars represent standard errors

$t(126) = -0.33$, $p = .74$, $CI_{95\%} = [-0.76, 0.55]$, Cohen's $d = 0.06$.[5]

Hypothesis testing

Impact of mimicry on perceived interaction quality

We predicted (H1) that even though during antagonistic conflicts perceived interaction quality should be lower than during affiliative conflicts, the perceived quality within both antagonistic and affiliative conflicts should also depend on the level of mimicry. As expected, a significant main effect of condition emerged ($\beta = -.86$, $p < .001$). Specifically,

[5] The TOST procedure (Lakens 2016) indicated that the observed effect sizes were significantly within the equivalence bounds of medium effect sizes (of Cohen's $d = -0.5$ and Cohen's $d = 0.5$), $t(126) = -2.47$, $p = .008$; $t(126) = -2.50$, $p = .007$; $t(126) = 2.50$, $p = .007$.

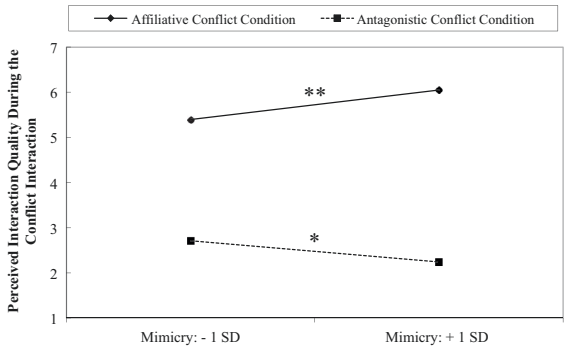

Fig. 3 Perceived interaction quality during the conflict interaction as a function of the interaction between mimicry (±1 *SD* from the mean) and the condition (affiliative and antagonistic conflict). Asterisks display significance of simple slopes (*$p < .05$, **$p < .01$)

participants reported significantly higher interaction quality in the affiliative than in the antagonistic conflict condition. By contrast, the main effect of mimicry was not significant ($p > .57$). However, the predicted interaction between mimicry and condition was significant ($\beta = -.14$, $p < .001$). Probing the interaction effect following Aiken and West (1991) (see Fig. 3 for a visualization of the simple slopes), revealed that in the antagonistic conflict condition, participants reported significantly lower interaction quality with increasing levels of mimicry (simple slope $z = -.12(.06)$, $t = -2.01$, $p = .047$). Conversely, participants in the affiliative conflict condition reported significantly higher interaction quality with increasing levels of mimicry (simple slope $z = .17(.06)$, $t = 2.84$, $p = .005$).

Impact of implicit affiliation motivation on mimicry

We further predicted that mimicry is an expression of an individuals' implicit affiliation motivation (H2). Additionally, we predicted mimicry during affiliative conflicts to be an expression of an individuals' implicit approach affiliation motivation, whereas mimicry during antagonistic conflicts was expected to be an expression of an individuals' implicit avoidance affiliation motivation (H3). As expected (H2), next to the significant main effect of condition, a significant main effect of general implicit affiliation motivation but no significant interaction effect emerged. Specifically, participants showed significantly less mimicry during antagonistic than during affiliative conflicts ($\beta = -.31$, $p < .001$). Further, general implicit affiliation motivation was significantly positively associated with mimicry ($\beta = .21$, $p = .013$); this relationship did not differ significantly between conditions ($p > .46$). Contrary to our predictions (H3), however, implicit approach affiliation motivation was also significantly positively associated with mimicry ($\beta = .20$, $p = .021$) with no significant difference in this relationship between conditions ($p > .78$). The same pattern emerged for the relationship between implicit avoidance affiliation motivation and mimicry ($\beta = .16$, $p = .059$), where also no significant difference between conditions ($p > .68$) emerged. Similar to data presented by Wirth and Schultheiss (2006), implicit approach affiliation motivation and implicit avoidance affiliation motivation were substantially correlated ($r = .49$, $p < .001$). Hence, for the sake of simplicity, in the following, we only report analyses using the general implicit affiliation score by Winter (1994).

In sum, in line with our predictions (H1), the relationship between mimicry and perceived interaction quality was positive for affiliative conflicts but negative for antagonistic conflicts. This suggests that the effects of mimicry fundamentally depend on the affiliativeness of the mimicked emotions (see Mauersberger et al. 2015). Further, as predicted (H2), mimicry was associated with implicit affiliation motivation. Yet, contrary to our prediction (H3), no differential effect for implicit approach versus implicit avoidance affiliation motivation was found.

Control analyses

To assess the reliability of the present results, we conducted several additional analyses. First, the pretest and manipulation check confirmed that the video-taped interaction partners showed more affiliative emotions during affiliative conflicts and more antagonistic emotions during antagonistic conflicts. However, the specific combination of video sequences seen by participants varied as a function of their choices. Hence, it is possible that some participants were exposed to more or less smiling than others and hence experienced a more or less pleasant interaction.

Yet, video-taped interaction partners' mean antagonism index (across all videos within each participant) did not correlate significantly with mimicry ($ps > .69$) or with perceived interaction quality ($ps > .14$). Further, when we controlled for video-taped interaction partners' mean antagonism index when predicting perceived interaction quality from mimicry and condition, effects emerged similarly (a significant main effect of the condition, $\beta = -1.00$, $p < .001$, and a significant interaction between mimicry and the condition, $\beta = -.14$, $p = .001$). Hence, potential differences in video-taped interaction partners' facial expression between participants did not affect results.

Second, participants who showed more mimicry than others during affiliative conflicts might have experienced more positive affect during the conflict interaction. Conversely, participants who showed more mimicry than others during antagonistic conflicts might have experienced more negative affect during the conflict interaction. Differences in affect between participants, in turn, may account for

differences in perceived interaction quality. In fact, positive affect correlated significantly with mimicry during affiliative ($r = .25$, $p = .047$) but not during antagonistic conflicts ($p > .30$). Conversely, negative affect correlated significantly with mimicry during antagonistic ($r = .31$, $p = .012$) but not during affiliative conflicts ($p > .70$). Further, positive affect correlated significantly with perceived interaction quality (affiliative conflicts: $r = .53$, $p < .001$, antagonistic conflicts: $r = .28$, $p = .022$) as did negative affect (affiliative conflicts: $r = -.59$, $p < .001$, antagonistic conflicts: $r = -.55$, $p < .001$). Thus, we reran the analysis predicting perceived interaction quality while controlling for positive and negative affect. Even though significant main effects of positive, $\beta = .08$, $p = .040$, and negative affect, $\beta = -.25$, $p < .001$, emerged, the predicted significant interaction between mimicry and condition, $\beta = -.08$, $p = .028$, as well as the main effect of condition, $\beta = -.73$, $p < .001$, remained significant. Hence, the condition-dependent effects of mimicry on perceived interaction quality cannot be attributed exclusively to differences in participants' affect.[6]

Third, even though explicit and implicit motives often do not correlate (as was the case in our sample, $p > .55$), participants' explicit affiliation motivation may nonetheless explain differences in mimicry. Hence, we controlled for mean centered explicit affiliation motivation as well as for the interaction between the dummy-coded mean centered condition contrast and mean centered explicit affiliation motivation when assessing the link between implicit affiliation motivation and mimicry. Results revealed only the significant main effect of condition ($\beta = -.31$, $p < .001$) and the significant main effect of implicit affiliation motivation ($\beta = .21$, $p = .015$). No other significant main or interaction effects emerged ($ps > .49$), suggesting that explicit affiliation motivation did not account for individual differences in the level of mimicry.

Discussion

Our findings provide strong support for the notion that individual differences in emotional mimicry are associated with perceived interaction quality during conflict interactions over and above the emotional tone of the conflict interaction. In line with the *Emotional Mimicry in Context* view (Hess and Fischer 2013), we found that the affiliativeness of the context, specifically, the degree to which the interaction partner showed an affiliative demeanor, acted as moderator of the effects of mimicry on interaction quality. Even though mimicry is often described as a means to establish mutual liking and understanding and to smoothen interactions (e.g., Sonnby-Borgström 2016; Stel and Vonk 2010; Yabar and Hess 2007), it is also dependent on the context of the interaction. In line with this view, only mimicry shown during affiliative conflicts was positively associated with interaction quality. Importantly, the interaction between the affiliativeness of the situation and mimicry was still present after we controlled for differences in affect between participants. Hence, it is unlikely that mimicry can be reduced to expressed affect.

By contrast, during antagonistic disagreements mimicry was associated with reduced interaction quality. In those situations, mimicry consisted mainly of the adoption of congruent negative affect expressions. This form of antagonistic mimicry reinforced negative interaction quality rather than serving to improve rapport. Thus, the present research suggests that not all congruent emotion expressions can be considered affiliative. Rather, only mimicry responses to affiliative expressions serve to improve interaction quality.

Interestingly, even though participants showed less mimicry during antagonistic compared to affiliative conflicts, in both cases the level of mimicry was associated with the strength of the implicit affiliation motivation. That participants overall showed less mimicry during antagonistic conflicts is in line with the observation that mimicry is reduced, absent or may even reverse, when others are (expected to be) competitors with opposing goals (Lanzetta and Englis 1989; Likowski et al. 2011; Weyers et al. 2009). Yet, some level of antagonistic mimicry was shown and was related to the strength of an individual's implicit affiliation motivation as was affiliative mimicry. Thus, individuals high in affiliative motivation seem to always show more mimicry—even in contexts that do not invite affiliation. This finding lends support to theories of mimicry that emphasize the desire to affiliate (e.g., Chartrand and Lakin 2013; Fischer and Hess 2017; Hess and Fischer 2013).

The duality of implicit affiliation motivation

Implicit affiliation motivation has repeatedly been found to correlate with markers of well-being and health (McClelland 1985; also see McClelland and Kirshnit 1988 for causal evidence) but also relates to negative affect and aggressive tendencies (Hofer and Busch 2011). Thus, it is plausible to assume that the strength of the implicit need for belonging determines how strongly people engage in (unconscious) behaviors that satisfy this need but also how strongly they are affected when the need is frustrated. Congruent with this view, Hess and Fischer (2013) suggest that only affiliative mimicry should be referred to as "proper" mimicry (as affiliation is a

[6] Probing the interaction effect revealed that whereas participants in the affiliative conflict condition reported significantly higher interaction quality with increasing levels of mimicry (simple slope $z = .15(.05)$, $t = 2.85$, $p = .005$), no significant simple effect of mimicry on the self-reported interaction quality during the antagonistic conflict condition could be found ($p > .74$).

crucial prerequisite for emotional mimicry) whereas antagonistic mimicry should be considered part of a reactive emotional response that just happens to be congruent. Specifically, these authors did not expect positive interactional consequences for antagonistic mimicry. In line with this notion, we found that whereas affiliative mimicry was associated with better interaction quality, antagonistic mimicry had the opposite effect. This is suggestive of the notion that different components of the implicit affiliation motivation are responsible for the two types of mimicry.

In fact, affiliation motivation can be divided into both an approach and an avoidance component (e.g., Sokolowski and Heckhausen 2008). In the literature, approach and avoidance motivational systems are considered to be distinct dimensions (see, e.g., Gable 2006). We therefore predicted that the implicit approach affiliation motivation triggers affiliative mimicry, whereas the implicit avoidance affiliation motivation triggers antagonistic mimicry. Yet, this was not what we found. Rather, we found similar effects for both components, which also correlated substantially. This pattern is similar to findings by Wirth and Schultheiss (2006). We discuss this issue below.

Strengths and limitations

To our knowledge, this is the first study that examined effects of mimicry during two types of conflicts—an affiliative conflict where participants experienced a task disagreement in a pleasant atmosphere and an antagonistic conflict where participants experienced a task disagreement in an unpleasant atmosphere. A strength of the design is that the conflict interactions were standardized and prerecorded. Further, we were able to point to a predicted but never tested antecedent of mimicry, namely, implicit affiliation motivation.

Our study also has limitations. Notably, the approach and avoidance component of implicit affiliation motivation were not independent. These two forms have been proposed as distinct components within implicit affiliation motivation (see, e.g., French and Chadwick 1956) but data that supports this claim is scarce. We only found one published study that collected both components separately and reported their interrelations: The findings from Wirth and Schultheiss (2006) contradict the postulate of independence of the two components (see also, Byrne et al. 1963, whose results, however, should be interpreted with caution, as the coding of implicit affiliation motivation focused primarily on the approach side of affiliation motivation). Also, the coding for implicit approach and implicit avoidance affiliation motivation is not experimentally validated. Hence, it is not guaranteed that the coding following Heyns et al. (1958) clearly dissociates both components. Future research should verify whether the lack of independence is an artifact of the coding process, whether indeed no independence exists or whether situational factors impact on the level of correlation between the components.

Conclusion

The present research provides evidence for the notion that the desire to affiliate is an important antecedent of emotional mimicry, which then relates to perceived interaction quality as a function of the affiliativeness of the context. Importantly, mimicry is often presented as a means to establish rapport and foster social warmth—the chameleon effect (Lakin et al. 2003). However, in line with the *Emotional Mimicry in Context* view (Hess and Fischer 2013), our findings suggest that during non-affiliative situations such as presented by antagonistic conflicts, mimicry may hurt rather than help.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in the study that involved human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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Mimicry and Conflicts–Supplemental Material

This appendix provides supplementary material for the manuscript *When smiling back helps and scowling back hurts: Individual differences in emotional mimicry are associated with self-reported interaction quality during conflict interactions* by Heidi Mauersberger and Ursula Hess.

Additional Measures

- Knowledge gain (Searle & Auton, 2015)
- Feelings of respect (Butcher, Sparks, & O'Callaghan, 2003; Porath & Pearson, 2012)
- Task performance: Guilford's Unusual Uses test; German version of the Compound Remote Associate task (Landmann et al., 2014)
- Contextual performance: Tangram (Help/Hurt) Task (Saleem et al., 2015)
- Post-experimental questions regarding the competence of the interaction partner during the conflict interaction

Items: Perceived Interaction Quality During the Conflict Interaction

- I felt comfortable during the interaction.
- I enjoyed the interaction.
- The atmosphere was pleasant.
- The atmosphere was tense.
- My interaction partner was friendly.
- My interaction partner was rude.
- I would like to work with this interaction partner again.
- I would *not* like to work with this interaction partner again.
- My interaction partner adopted a positive stance during the interaction.
- My interaction partner adopted a negative stance during the interaction.
- I felt liked during the interaction.
- I felt disliked during the interaction.
- I felt understood during the interaction.

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Appendix C: Manuscript 3

Mauersberger, H., Hoppe, A., Brockmann, G., & Hess, U. (2018). Only reappraisers profit from reappraisal instructions: Effects of instructed and habitual reappraisal on stress responses during interpersonal conflicts. *Psychophysiology, 55*, e13086.

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ORIGINAL ARTICLE

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Only reappraisers profit from reappraisal instructions: Effects of instructed and habitual reappraisal on stress responses during interpersonal conflicts

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Abstract

Conflicts are an undesirable yet common aspect of daily interactions with wide-ranging negative consequences. The present research aimed to examine the buffering effect of experimentally instructed reappraisal on self-reported, physiological and behavioral stress indices during interpersonal conflicts, taking into account habitual emotion regulation strategies. For this, 145 participants experienced a standardized laboratory conflict with the instruction to either reappraise ($n = 48$), to suppress ($n = 50$), or with no instruction ($n = 47$) while cardiovascular and neuroendocrine measures were taken. Participants were allowed to eat sweet and salty snacks during the conflict situation. Prior to as well as after the conflict, participants reported on their subjective stress level. Reappraisal instructions were only effective for high habitual reappraisers who exhibited lower cardiovascular and cortisol reactivity and demonstrated fewer snack-eating behaviors under reappraisal instructions than under suppression or no instructions. The opposite pattern emerged for low habitual reappraisers. Neither experimentally instructed nor habitual reappraisal by itself reduced the negative effects of conflicts. Our findings complement the literature on the diverging effects of instructed reappraisal in tense social interactions.

KEYWORDS

conflict, cortisol, emotion regulation, interbeat interval, reappraisal, social stressor

1 | INTRODUCTION

Interpersonal conflicts are common stressors in all arenas of life (Narayanan, Menon, & Spector, 1999). They have attracted special interest in research on workplace stress, which distinguishes task conflicts from emotional (or relationship) conflicts (Jehn, 1997). Whereas task conflicts, which focus purely on task aspects, can be constructive, as they can help to find better solutions (e.g., Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006), conflicts that include interpersonal friction and hostility (emotional conflicts) generally have negative consequences. These types of conflict threaten the fundamental human need to maintain high social esteem (e.g., Semmer, Jacobshagen, Meier, & Elfering, 2007) and consequently produce distress and strain (Medina, Munduate, Dorado, Martínez, & Guerra, 2005; Spector & Jex, 1998). Hence, in these potentially negative situations, stress-buffering emotion regulation strategies are especially useful not only at the workplace but also in other life domains.

Two well-researched emotion regulation strategies are (cognitive) reappraisal and (expression) suppression (Gross & John, 2003). Reappraisal refers to reevaluating a situation's meaning to alter the emotional experience and can be used to up- or downregulate emotions or to change the type of emotion experienced (Shiota & Levenson, 2009). In order to downregulate emotions, individuals can either reframe the stressor in an objective, unemotional way (Gross, 1998) or focus on the positive aspects of the event (Shiota & Levenson, 2009). The habitual use of reappraisal is positively related to interpersonal functioning, well-being, and stress resilience (e.g., Carlson, Dikecligil, Greenberg, & Mujica-Parodi, 2012; John & Gross, 2004).

As such, instructing individuals to reappraise should be a promising strategy in a stressful situation. Yet, even though instructed reappraisal is overall an effective strategy according to a meta-analysis by Webb, Miles, and Sheeran (2012), when considering different types of emotional stimuli, instructed reappraisal was more effective for the regulation of emotions elicited by passive picture viewing than by a social stress task. Specifically, the limited research on the use of reappraisal instructions in social settings (e.g., during the discussion of distressing topics or during a social-evaluative speech task) came to contradictory results. In some cases, instructed reappraisal increased (e.g., Denson, Creswell, Terides, & Blundell, 2014), in others it decreased (physiological) stress responses (e.g., Ben-Naim, Hirschberger, Ein-Dor, & Mikulincer, 2013; Gong, Li, Zhang, & Rost, 2016); alternatively no clear effects on (physiological) stress indices emerged (Butler et al., 2003; Butler, Gross, & Barnard, 2014; note that three other (older) studies by Butler and collegues use the same data set as Butler et al., 2014, and are therefore not reported here). Hence, the buffering effects of instructed reappraisal on stress responses seem to be less clear-cut for emotion regulation in a social setting.

1.1 | Nonsocial versus social stressors

There are several reasons for why the effects of instructed reappraisal on stress responses observed during the passive viewing of videos or pictures may not generalize to the demands of social settings. First, when faced with a video or slide, it is possible to withdraw from the situation by closing the eyes, focusing on nonthreatening content, or turning away from the screen. These behaviors are not appropriate in a social situation. Reappraisal requires individuals to override their automatic reaction to the emotional content of an event (e.g., Sheppes & Meiran, 2008) and to cognitively elaborate on the situation. Thus, when instructed reappraisal is used to downregulate emotions elicited by a high intensity stressor such as a social stressor, it may compete for cognitive resources needed for coping with the stressor (Sheppes & Gross, 2011; Sheppes & Meiran, 2008). However, this demand may be less onerous for people who habitually use reappraisal and hence have practice in its use in social contexts. By contrast, individuals who do not habitually engage in reappraisal may find the task to reappraise during a social stressor to be an additional cognitive burden, causing in fact additional stress. The present study addressed the interaction between instructed and habitual forms of emotion regulation in a stressful social setting—during an interpersonal conflict.

1.2 | The present study

The aim of the study was to assess the interaction between emotion regulation instructions and habitual emotion regulation strategies on stress in an interpersonal conflict situation using a multimodal assessment of stress. This question is novel and has not been previously addressed. Based on the considerations above, we predicted that reappraisal instructions would be more effective for individuals who habitually engage in reappraisal to regulate emotions. For individuals who do not habitually engage in reappraisal, higher stress under reappraisal instructions was expected. We included two control conditions: first, a no instruction control condition and, second, a suppression instruction control condition.

Suppression is a less effective emotion regulation strategy, which typically results in negative side effects (see studies by Butler and colleagues, e.g., Butler et al., 2003). However, individuals practiced in suppression do not experience these negative effects to the same degree (Butler, Lee, & Gross, 2007). Hence, suppression instructions may trigger fewer negative effects when used by individuals who habitually engage in suppression to regulate emotions. However, we would not expect that this results in better coping with the stressor. Rather, for people who habitually use suppression, its instructed use should not cause additional stress.

In this study, we assessed stress reactions through self-reported stress, physiological indices of stress (cardiovascular and cortisol reactivity), as well as through snack food intake as a behavioral index of stress (see, e.g., Cartwright et al., 2003; Groesz et al., 2012) during the interpersonal conflict. The effects of reappraisal on eating behaviors during social stressors have not been examined yet, and evidence for the effects of reappraisal on eating behaviors during nonsocial stressors is mixed. Even though Taut, Renner, and Baban (2012) found that reappraisal reduces the likelihood of eating while watching fear-inducing movie clips, other findings regarding the effects of either habitual or instructed reappraisal on the desire to eat and eating behaviors during nonsocial negative emotional situations are less clear (Evers, Marijn Stok, & de Ridder, 2010; Svaldi, Caffier, & Tuschen-Caffier, 2010). However, these studies did not (fully) take into account that people's habitual eating style during stress differs—whereas some people eat more when stressed (stress hyperphagics), others tend to eat less (stress hypophagics), or their eating is not affected by stress (Oliver & Wardle, 1999; Sproesser, Schupp, & Renner, 2014; Zellner et al., 2006). Hence, we expected differential effects of the interaction between emotion regulation instructions and habitual emotion regulation strategies on snack food intake for stress hyper- and hypophagics.

2 | METHOD

2.1 | Participants and design

We based our power analysis for the interaction between instructed and habitual reappraisal on the mean effect size of

a categorical by continuous variable interaction of $f^2 = .059$ observed across three studies by Kafetsios, Andriopoulos, and Papachiou (2014). To detect this effect with an alpha level of .05 and a power of at least .80, a total of 146 individuals (97 women) were recruited via the participant database at the Humboldt-Universität zu Berlin (PESA). As one participant (0.7%) discontinued participation, data from 145 participants (96 women; $M_{age} = 32.2$, $SD_{age} = 12.2$) were included in the analyses. Participants were randomly assigned to one of three conditions: reappraisal ($n = 48$), suppression ($n = 50$), no instruction ($n = 47$). We asked participants to not eat, drink (except for water), chew gum, brush their teeth, or exercise 2 hr prior to the laboratory session. All participants reported being in good health (specifically, no one reported any severe infections, cancer, tumors, immune, autoimmune, or metabolic diseases or endocrine disorders), and nobody took prescription medication (except for oral contraceptives). They participated individually and received either course credit or €10 per hour. The laboratory session lasted approximately 1 hr 20 min. The study was carried out in accordance with the guidelines of the Declaration of Helsinki and was approved by the Institutional Ethics committee. Participants were aware that they had the right to discontinue participation at any time and that their responses were confidential. Men and women were equally distributed across conditions, $\chi^2(2, N = 145) = 0.13$, $p = .937$, as was menstrual cycle phase ($p = .524$, Fisher's exact test).

2.2 | Procedure

One day prior to the laboratory session, participants completed an online questionnaire measuring demographics (sex, age, menstrual cycle phase, smoking behavior), planned time to get up on the next day, habitual emotion regulation strategies, and habitual eating behaviors. Due to equipment malfunction and participants' error (two participants confirmed to have filled out the questionnaire but no data could be matched to their code), online questionnaire data from four participants were missing. Upon arrival at the laboratory, after providing informed consent, participants were seated in a comfortable chair in front of a computer screen and electrodes were attached. After watching a relaxing baseline video during which a baseline cortisol sample was taken, participants reported on their subjective stress level. Then, they engaged in a standardized laboratory task designed to elicit the interpersonal conflict. Depending on the condition, they were instructed to either reappraise or to suppress or received no instruction. Cardiovascular activity was measured continuously. To control for diurnal variation in cortisol levels, conditions were uniformly distributed across morning (9:00–12:00), afternoon (12:00–15:00), and evening (15:00–18:30) sessions, $\chi^2(4, N = 145) = 0.92$, $p = .922$. Participants had the opportunity to eat treats (sweets and salty snacks) during the entire conflict situation. Following the conflict, participants reported again on their subjective stress level, answered some affectively neutral questions, and worked on a riddle until approximately 15 min past the climax of the conflict when poststressor cortisol was taken. Then, participants were asked about the amount of conflict they had experienced during the conflict task and whether they had reappraised or suppressed their emotions during the conflict task. Finally, after completing a postexperimental questionnaire, detaching the electrodes, and measuring participants' height and weight, participants were first asked to report their emotion regulation instructions and then were fully debriefed and all outstanding questions were answered by the investigator. Figure 1 shows the time line for the experimental procedures.

2.3 | Laboratory conflict task

To evoke a standardized but emotionally arousing conflict, we used a task developed by Mauersberger, Hess, and Hoppe (2018). For this, participants discussed the implementation of an organizational measure with a same sex interaction partner via video messages. This individual, in fact, did not exist, and all answers were prerecorded and carefully programmed to match participants' choices in a way that created a task

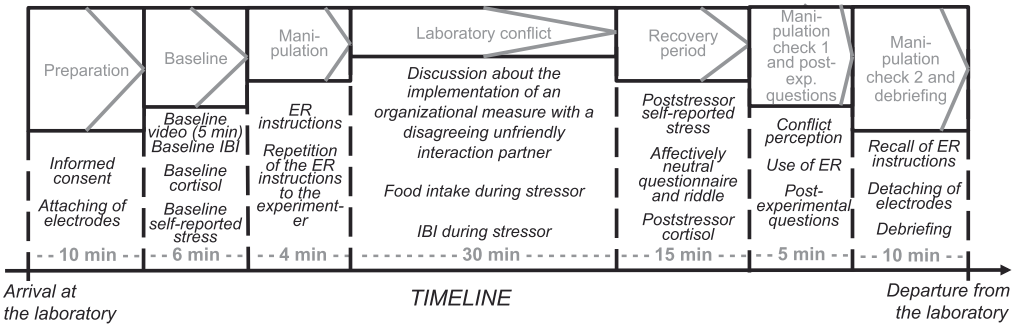

FIGURE 1 Time line for the experimental procedures. IBI = interbeat interval. ER = emotion regulation

conflict. As the simulated participant additionally behaved in an unfriendly and malicious manner, an emotional conflict emerged in addition to the task conflict.

The conflict task consisted of two blocks—a first block where the content of an organizational measure and a second block where the precise realization of the measure were discussed. A random choice was simulated such that participants always started the discussion. Participants took position regarding several aspects of the implementation of the organizational measure by choosing one of several options from a list. Once an option was chosen, participants were asked to explain their choices in a video statement. They then received a video statement from the virtual interaction partner (based on their response choices) who systematically argued against their choices in an unfriendly manner (see online supporting information Appendix S1 for an exemplary range of options and an exemplary response of a simulated interaction partner to one of those options). The conflict reached its climax after an exchange of 13 video messages when participants had to watch their interaction partners submit the final evaluation of the collaboration: They were told in a resolute and unempathic way that all their choices were inconclusive and that their line of argument was foolish throughout. The conflict task was validated with an independent sample (see supporting information Appendix S1 for validation data).

2.4 | Emotion regulation instructions

Participants received emotion regulation instructions prior to the conflict task as part of the written instructions presented on screen. The instructions for the reappraisal condition were: "During the following team activity, think about the situation in such a way that you remain calm and dispassionate," and for the suppression condition: "During the following team activity, behave in such a way that your partner does not know you are feeling any emotions at all" (Butler et al., 2003). In the no instruction condition, no instructions were given. To ensure full understanding of the instructions, participants repeated the instructions in their own words to the experimenter immediately after reading them.

2.5 | Self-report measures

2.5.1 | Habitual emotion regulation strategies

We used the German version of the Emotion Regulation Questionnaire (Gross & John, 2003) by Abler & Kessler (2009) to measure habitual reappraisal ($\alpha = .86$) and habitual suppression ($\alpha = .78$) with 10 items. Participants indicated their agreement or disagreement with each item on a 7-point response scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Data from one participant were excluded, as responses to several items were missing.

2.5.2 | Habitual eating behaviors

The habitual tendency to eat in response to interpersonal stress was measured with one item using a 5-point response scale: "When other people cause me stress (e.g., partner, friends, relatives, colleagues), I eat … 1 = *much less than usual*, 2 = *less than usual*, 3 = *the same as usual*, 4 = *more than usual*, 5 = *much more than usual*" (see Sproesser et al., 2014). Further, emotional eating was measured with the subscale "emotional eating behaviors" of the German version of the Dutch Eating Behavior Questionnaire (Van Strien, Frijters, Bergers, & Defares, 1986) by Grunert, 1989. Participants had to answer the 10 items on a 5-point response scale anchored with 1 = *never* and 5 = *very often* ($\alpha = .92$).

2.5.3 | Self-reported stress

To reduce participants' awareness of our aim to assess their subjective stress level, we embedded the relevant items into a questionnaire that supposedly measures physical sensation relevant to a laboratory task (e.g., eyes hurting, tense muscles, see Hess & Blairy, 2001). On a 7-point response scale anchored with 1 = *not at all* and 7 = *very much*, participants rated the degree to which they felt stressed and relaxed in this very moment ($\alpha_{baseline} = .60$, $\alpha_{postconflict} = .66$). Self-reported stress reactivity was calculated by subtracting the score prior to the conflict from the score after the conflict.

2.5.4 | Conflict perception

The German version of Jehn's Conflict Scale (Jehn, 1995) by Lehmann-Willenbrock, Grohmann, and Kauffeld (2011) was adapted for the laboratory setting. Specifically, we asked for the presence or absence, respectively, of conflicts during the conflict task and, if present, participants were asked to rate the intensity and not the frequency of task conflicts (e.g., "How intense were these differences of opinion between you and your interaction partner?"; $\alpha = .57$) and emotional conflicts (e.g., "How intense were these tensions between you and your interaction partner?"; $\alpha = .83$) on a 6-point response scale (from 1 = *mild* to 6 = *intense*).

2.5.5 | Use of reappraisal and suppression

Participants rated the degree (from 1 = *not at all* to 5 = *very much*) (a) to which they thought about the situation in such a way that they remained calm and objective, and (b) to which they behaved in such a way that their partners did not recognize that they were feeling any emotions.

2.5.6 | Postexperimental questions

Participants answered several questions regarding the perceived relationship quality ("I felt understood/respected/taken seriously"; $\alpha = .78$), the perceived (communication) competence of the interaction partner ("My interaction partner was competent/attentive/expressive/used more constructive criticism/used less destructive criticism/had an informed opinion," "I took my interaction partner seriously"; $\alpha = .66$), the perceived positive stance of the interaction partner ("My interaction partner was friendly/showed positive emotions," "In spite of discrepancies in opinion, we liked each other"; $\alpha = .66$), the negative stance of the interaction partner ("My interaction partner showed negative emotions") and their own engagement in the task ("It worked out well for me to discuss [the implementation of the organizational measure] via video messages") on a 7-point response scale (from 1 = *not at all* to 7 = *very much*). Data from one participant were excluded due to an abnormal response pattern.

2.6 | Physiological and behavioral measures

2.6.1 | Cardiovascular activity

Electrocardiography (ECG) was continuously recorded at a sampling rate of 1000 Hz. For this, after the skin was cleansed with rubbing alcohol, two prejelled Mindware Ag/AgCl snap disposable vinyl electrodes were placed on the participants' right collarbone and left lower rib, and one prejelled Mindware Ag/AgCl snap disposable vinyl reference electrode was placed on participants' right lower rib. A Mindware BioNex impedance cardiograph amplifier with a band-pass filter of 0.5 Hz–100 Hz (and a 50 Hz notch filter) was used, and the ECG signal was converted into R-wave intervals. Artifacts and recording errors were corrected manually. Interbeat interval (IBI) data from two participants (one in the reappraisal condition, one in the suppression condition) were removed from the analyses due to excessive artifacts. IBI reactivity was calculated by subtracting baseline IBI (i.e., average IBI during the 5 min of the baseline video) from the average IBI during the last video message that participants received from interaction partners, which lasted approximately 40 s.

2.6.2 | Salivary cortisol

Saliva was collected using standard Salivettes (Sarstedt AG & Co., Nümbrecht, Germany). Participants were asked to place the swab in their mouth and were instructed to gently chew on it for about 90 s (until saturated with saliva) and then replace it in the tube. Pre- and postconflict salivary cortisol samples were stored at −20°C in a freezer in our laboratory before being sent to the Laboratory of Biopsychology at the Technical University of Dresden, Germany, for analysis. After thawing, Salivettes were centrifuged at 3,000 rpm for 5 min, which resulted in a clear supernatant of low viscosity. Salivary cortisol concentrations were measured using a commercial immunoassay kit with chemiluminescence detection (IBL International, Hamburg, Germany). Intraassay and interassay coefficients of variations were below 8%. The lower limit of detection was 0.43 nmol/liter. All saliva samples had detectable levels of cortisol. Cortisol reactivity was calculated by subtracting log-transformed baseline salivary cortisol (i.e., salivary cortisol during the 5 min of the baseline video) from the log-transformed salivary cortisol approximately 15 min past the end of the conflict task.

2.6.3 | Food intake

Food bowls were placed on the table next to the computer screen at the beginning of the procedure. To account for the differences in preferences for salty or sweet food, food bowls were filled with salted pretzels, M&Ms, and gummy bears. The food was presented as an incentive for participation, and participants were encouraged to help themselves. The food bowls were weighed at the beginning and at the end of the experiment. The index for food intake was created by subtracting the final from the initial weight. Data from five participants were removed from the analyses due to food intake scores > 3 interquartile range from the 75th percentile.

3 | RESULTS

Preliminary analyses of variance (ANOVAs) with condition as factor indicated that participants in different conditions did not differ significantly in their habitual use of reappraisal, $F(2, 137) = 0.02$, $p = .984$, $\eta_p^2 < .001$, or suppression, $F(2, 137) = 0.04$, $p = .958$, $\eta_p^2 = .001$, their habitual eating behaviors (eating in response to interpersonal stress, $F(2, 138) = 0.88$, $p = .418$, $\eta_p^2 = .013$, emotional eating, $F(2, 138) = 0.05$, $p = .955$, $\eta_p^2 = .001$), their baseline self-reported stress, $F(2, 142) = 0.72$, $p = .489$, $\eta_p^2 = .010$, their baseline IBI, $F(2, 140) = 0.001$, $p = .999$, $\eta_p^2 < .001$, or baseline cortisol, $F(2, 142) = 0.90$, $p = .409$, $\eta_p^2 = .013$. Further, across conditions, one-sample t tests revealed that nearly all participants perceived a task conflict, $M = 100\%$, $t(144) = 307$, $p < .001$, $d = 25.5$, $CI_{95\%} = [99\%, 100\%]$, as well as an emotional conflict, $M = 97\%$, $t(144) = 102$, $p < .001$, $d = 8.49$, $CI_{95\%} = [95\%, 99\%]$, during the conflict task.

In order to examine whether conditions had distinct effects as a function of habitual emotion regulation strategies, we created two dummy-coded variables based on the categorical instruction variable (which was comprised of the three conditions: reappraisal, suppression, and no instruction, with the no instruction condition as the reference group). In all following regression analyses, continuous variables were z-standardized, and interaction terms were calculated by

multiplying z-standardized continuous variables with dummy-coded mean centered categorical variables. To account for potential violations of homoscedasticity,[1] we used robust standard error estimators for the regression coefficients.

3.1 | Manipulation check

We had predicted that the effect of emotion regulation instructions on the implementation of the instructions would be moderated by participants' habitual preference for emotion regulation. Hence, no main effect of condition was expected. To test our assumptions, we first conducted an ANOVA with condition as factor, which revealed no significant difference in reported use of reappraisal between conditions: $F(2, 142) = 0.43$, $p = .653$, $\eta_p^2 = .006$. We then conducted a multiple regression analysis to predict the reported use of reappraisal during the conflict task from condition and habitual reappraisal. That is, use of reappraisal was regressed on the reappraisal and suppression condition contrast, as well as on habitual reappraisal (Step 1) and on the interaction between the reappraisal condition contrast and habitual reappraisal (Step 2). Results revealed that only habitual reappraisal ($\beta = .26$, $p = .018$) but not the reappraisal condition contrast was significantly associated with reported use of reappraisal during the conflict task. Further, as expected, the interaction between the reappraisal condition contrast and habitual reappraisal was significant ($\beta = .55$, $p = .041$). Probing the interaction effect following Aiken and West's (1991) instructions (see Figure 2 for a visualization of the simple slopes) showed that only high habitual reappraisers (here and in the following, *high* always refers to scores 1 *SD* above the mean) reported using significantly more reappraisal in the reappraisal condition compared to the other two conditions (simple slope $z = .46$ (.23), $t = 2.00$, $p = .047$). This effect reverses for low habitual reappraisers (here and in the following, *low* always refers to scores 1 *SD* below the mean); however, the simple slope was not significant. As it is an arbitrary decision whether the condition or the habitual emotion regulation strategy should function as moderator, we also conducted simple slope analyses where we used the condition as moderator: Simple slope analyses revealed that participants used significantly more reappraisal with increasing levels of habitual reappraisal in the reappraisal condition (simple slope $z = .63$ (.25), $t = 2.58$, $p = .011$). No such effects could be found in the other two conditions.

[1]There is reason to suspect problems with homoscedasticity in one of the regression analyses: Similar to Taut, Renner, and Baban (2012), participants were free to eat snacks during the conflict task. Hence, only 63% of the participants started to eat, which resulted in a right-skewed distribution of the food intake measure.

With regard to the use of suppression, we similarly first conducted an ANOVA with condition as factor, which also revealed no significant difference in reported use of suppression between conditions: $F(2, 142) = 1.72$, $p = .184$, $\eta_p^2 = .024$. Then, we regressed use of suppression on the reappraisal and suppression condition contrast, as well as on habitual suppression (Step 1) and on the interaction between the suppression condition contrast and habitual suppression (Step 2). No significant effects emerged for the first step ($ps \geq .081$). However, the suppression condition contrast by habitual suppression interaction term indicated a significant differential effect for high and low habitual suppressors ($\beta = .36$, $p = .018$, see Figure 2). Similarly to the results for reappraisal, simple slope analyses revealed that high habitual suppressors reported using significantly more suppression in the suppression condition compared to the other two conditions (simple slope $z = .70$ (.26), $t = 2.74$, $p = .007$). In contrast, no such effects could be found for low habitual suppressors. Further, when condition was used as moderator, we found that, in the suppression condition, participants used significantly more suppression with increasing levels of habitual suppression (simple slope $z = .30$ (.10), $t = 3.04$, $p = .003$). No such effects could be found in the other two conditions.

In sum, self-reports obtained after the conflict task suggested that participants who typically engage in reappraisal or suppression used the respective strategy more when instructed to do so than when instructed to do something else or not instructed at all and than participants who typically do not engage in reappraisal or suppression.

3.2 | The effect of emotion regulation instructions and habitual emotion regulation strategies on stress indices

We had predicted that the effect of emotion regulation instructions on stress indices would be moderated by participants' habitual preference for emotion regulation. As several ANOVAs with condition as factor did not reveal significant differences between conditions for any of the stress indices ($ps \geq .141$), we conducted multiple regression analyses on the stress indices (self-reported stress reactivity, IBI reactivity, cortisol reactivity, and food intake) to assess the effects of reappraisal condition and habitual reappraisal as well as of suppression condition and habitual suppression (Step 1). Only the main effect of habitual suppression reached significance for IBI reactivity and food intake as dependent variables: Habitual suppression significantly reduced IBI reactivity and increased food intake. No other main effects emerged (see Table 1 for the exact coefficients). Yet, when adding the interaction terms between condition and habitual emotion regulation strategy (Step 2), a significant reappraisal condition contrast by habitual reappraisal interaction emerged for IBI reactivity, cortisol reactivity, and food intake. Simple slope

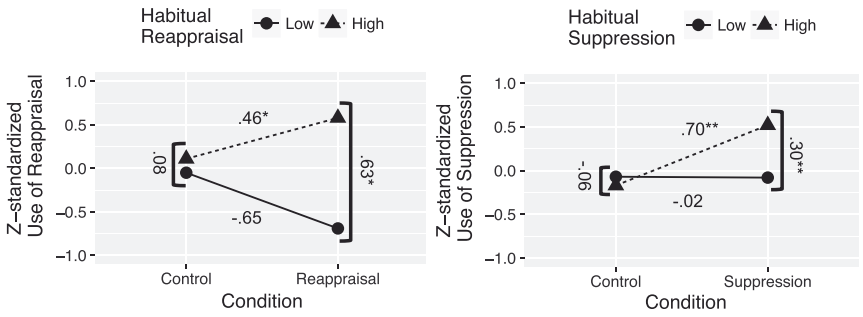

FIGURE 2 Interaction between reappraisal condition and habitual reappraisal on use of reappraisal and interaction between suppression condition and habitual suppression on use of suppression. "Control" refers to the other two conditions. Asterisks display significance of simple slopes (*$p < .05$, **$p < .01$)

analyses indicated that high habitual reappraisers showed significantly lower cortisol reactivity (simple slope $z = -.66$ (.25), $t = -2.62$, $p = .010$), and low habitual reappraisers showed significantly higher cortisol reactivity (simple slope $z = .59$ (.27), $t = 2.20$, $p = .029$) in the reappraisal condition compared to the other two conditions. Further, high habitual reappraisers ate significantly less (simple slope $z = -.81$ (.23), $t = -3.61$, $p < .001$) and low habitual reappraisers ate more (albeit not significantly more) in the reappraisal condition compared to the other two conditions (see Figure 3 for a visualization of the simple slopes). It should be noted that this effect was further qualified by habitual eating in response to interpersonal stress and that similar results could be found when considering only those participants who ate at all and when only eating versus noneating was examined (see supporting information Appendix S1 for additional analyses). A similar pattern without significant simple slopes emerged for IBI reactivity (larger IBI difference scores for high habitual reappraisers and smaller IBI difference scores for low habitual reappraisers in the reappraisal condition compared to the other two conditions, see Figure 3). Simple slope analyses with condition as moderator revealed three significant effects: In the reappraisal condition, participants showed significantly larger IBI difference scores (simple slope $z = .35$ (.14), $t = 2.56$, $p = .012$), significantly lower cortisol reactivity (simple slope $z = -.42$ (.11), $t = -3.81$, $p < .001$), and significantly reduced food intake (simple slope $z = -.29$ (.14), $t = -2.04$, $p = .044$) with increasing levels of habitual reappraisal. No such effects could be found in the other two conditions.

No significant main effects or interaction effects emerged for self-reported stress reactivity. Inspection of the means of high and low habitual reappraisers (see Figure 3) revealed that low habitual reappraisers reported higher stress reactivity in the reappraisal condition than either high habitual reappraisers in the reappraisal condition or high or low habitual reappraisers in the other two conditions. However, this difference was not significant. In sum, only participants who typically engage in reappraisal showed evidence of reduced

TABLE 1 Effects of condition and habitual emotion regulation on four indices of stress

	Stress reactivity		IBI reactivity		Cortisol reactivity		Food intake	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.04		.08*		.01		.07
Reappraisal condition	.24		−.01		−.04		−.33	
Habitual reappraisal	−.06		.10		.01		.04	
Suppression condition	.27		.02		.07		.07	
Habitual suppression	.14		−.26**		.05		.16*	
Step 2		.01		.04		.09**		.06*
Reappraisal Condition × Habitual Reappraisal	−.19		.39*		−.63***		−.49**	
Suppression Condition × Habitual Suppression	.05		−.12		.09		−.20	
Total R^2		.05		.12*		.10*		.12**
N	140		139		140		135	

Note. IBI = interbeat interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

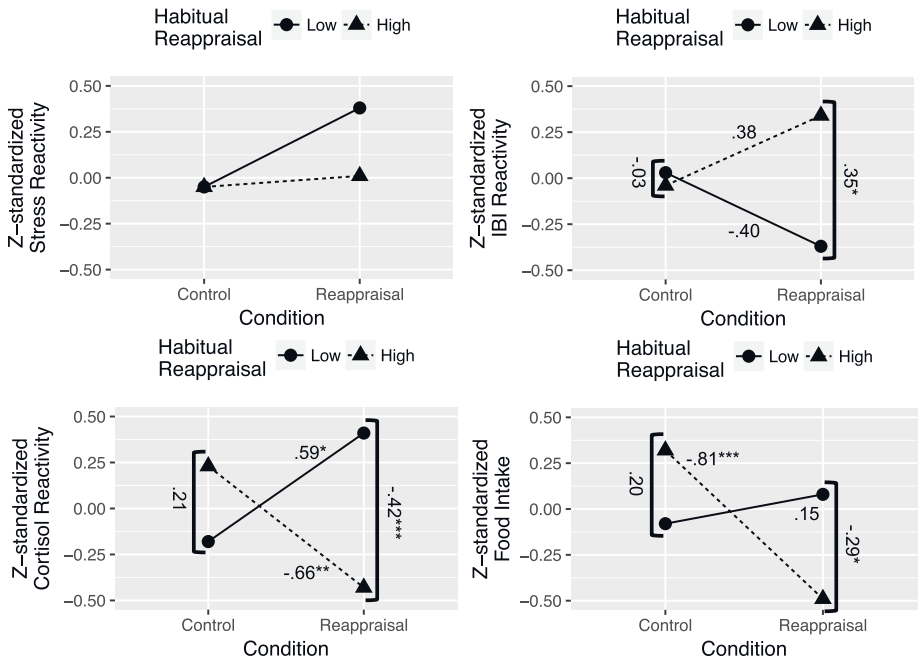

FIGURE 3 Interaction between reappraisal condition and habitual reappraisal on four indices of stress. "Control" refers to the other two conditions. IBI = interbeat interval. Asterisks display significance of simple slopes (*$p < .05$, **$p < .01$, ***$p < .001$)

stress in terms of physiological stress indices and snack food consumption when instructed to reappraise.

Several factors are known to influence physiological stress reactivity such as sex, age, body mass index (BMI), hours awake, smoking, menstrual cycle phase, and use of oral contraceptives (Dickerson & Kemeny, 2004; Foley & Kirschbaum, 2010; Kirschbaum, Kudielka, Gaab, Schommer, & Hellhammer, 1999). Further, sex, age, BMI, smoking, and habitual eating behaviors influence the amount of snack food eaten under stressful conditions (Grunberg, 1982; Grunberg & Straub, 1992; Zellner et al., 2006). Supplementary analyses including these variables were carried out (see supporting information Appendix S1) and confirmed that even though one or the other control variable influenced IBI reactivity, cortisol reactivity, or food intake, the interaction between the reappraisal condition contrast and habitual reappraisal remained significant throughout the analyses. Further, supplementary analyses (see supporting information Appendix S1) revealed the same results when separate models for reappraisal and suppression were run.

3.3 | Exploratory analyses

In search of potential reasons for why only individuals who habitually reappraise benefit from the stress-alleviating effects of instructed reappraisal, we conducted exploratory analyses on participants' perceptions of the relationship quality, the competence of the interaction partner, the positive and negative stance of the interaction partner, as well as on their engagement in the conflict task, which were assessed at the end of the experimental session. Similar to the analyses of condition and habitual emotion regulation strategy on stress, a significant interaction between the reappraisal condition contrast and habitual reappraisal emerged for relationship quality, $\beta = .41$, $p = .015$, and for the competence of the interaction partner, $\beta = .45$, $p = .005$. Further, we found a significant main effect of the reappraisal condition contrast on the competence of the interaction partner, $\beta = .40$, $p = .046$. Yet, this significant main effect was qualified by the significant interaction effect: Simple slope analyses indicated that high habitual reappraisers perceived interaction partners as significantly more competent in the reappraisal condition compared to the other two conditions (simple slope $z = .86$ (.26), $t = 3.26$, $p = .001$). However, this was not the case for low habitual reappraisers. Simple slope analyses revealed a similar pattern, albeit without significant simple slopes, for relationship quality (higher relationship quality for high habitual reappraisers and lower relationship quality for low habitual reappraisers in the reappraisal condition compared to the other two conditions). Further, when condition was used as moderator, results revealed that participants perceived interaction partners as significantly more competent (simple slope $z = .24$ (.11), $t = 2.11$, $p = .036$), and experienced significantly higher relationship quality (simple

slope $z = .28$ (.12), $t = 2.42$, $p = .017$) in the reappraisal condition with increasing levels of habitual reappraisal. No such effects could be found in the other two conditions. This finding suggests that the overall interaction quality is lower for individuals who do not habitually reappraise but are instructed to do so. One can speculate that this is due to a higher cognitive load posed by the unfamiliar regulation task, which allowed less focus on the interaction (see Butler et al., 2007, for a similar argument).

4 | DISCUSSION

In Western cultures, reappraisal tends to be associated with clear benefits, whereas suppression is seen as a maladaptive emotion regulation strategy (Gross, 1998). We examined the interaction between emotion regulation instructions and habitual emotion regulation strategies on stress in an interpersonal conflict situation modeled on a workplace conflict. In line with previous research (see, e.g., Lam, Dickerson, Zoccola, & Zaldivar, 2009), we found that habitual suppression had adverse effects on physiological and behavioral measures of stress (cardiovascular reactivity and amount of snack food intake). Further, high habitual suppressors seemed to accrue even more negative effects when additionally instructed to suppress (see supporting information Appendix S1). This is in contrast to findings that individuals practiced in suppression can use this strategy more successfully (Butler et al., 2007). However, in the case of Butler and colleagues, the use of suppression was culturally adequate and hence its users may have learned to use it successfully in that context.

More importantly, the present findings suggest that instructing a person to reappraise a situation is not always effective. We did not find a buffering effect of reappraisal instructions. This is in line with previous research that focused on reappraisal in social settings (Butler et al., 2003; Denson et al., 2014). In an extension of previous findings, we found that under reappraisal instructions only high habitual reappraisers successfully downregulated their emotions as shown by physiological and behavioral stress indices.[2] In contrast, low habitual reappraisers experienced the interpersonal conflict as particularly negative when instructed to reappraise than when given other or no instructions. This is suggestive of the notion that being required to reappraise during a demanding social interaction "backfires" on those who have little experience with this strategy. In fact, it seems that the resulting inadequate implementation of the reappraisal instructions increased stress in low habitual reappraisers, because the inhibition of their habitual emotion regulation strategy in order to try and reappraise consumed cognitive resources that could have been used to address the stressful event. An alternative hypothesis could be that low habitual reappraisers simply forgot their instructions. However, debriefing interviews showed that only five participants did not clearly remember the content of the instructions they received prior to the interpersonal conflict. Hence, a lack of expertise in the use of reappraisal is more likely the reason for the failure to implement the strategy successfully.

In sum, in interpersonal conflicts or similarly demanding social situations, it does not suffice to simply instruct people to reappraise. Rather, in order for reappraisal to be effective in complex everyday social stress situations, it has to become a habitual reaction. Emotion regulation abilities are skills that can be expanded and trained (Arthur, Bennett, Edens, & Bell, 2003; Berking & Lukas, 2015). Only if reappraisal instructions are internalized and practiced can they work effectively in real-life situations.

4.1 | Self-reported, physiological, and behavioral measures of stress

We observed that high habitual reappraisers under reappraisal instructions experienced lower stress measured with physiological (i.e., cardiovascular and cortisol reactivity) and behavioral (i.e., amount of snack food intake) stress indices. However, we did not find effects on self-reported stress. At first glance this is concerning, as we would expect that successful downregulation via reappraisal use should be evident to the participants themselves as well. Yet, whereas the physiological and behavioral measures were taken during the conflict task (due to the time delay of cortisol responses, cortisol levels measured after a stressor actually reflect physiological stress levels during a stressor), self-report was obtained after the conflict task. It is possible that by that time effects had already diminished. It is also possible that the lack of effects in self-reported stress for high habitual reappraisers reflects the "mood-buffering cortisol effect" (Het, Schoofs, Rohleder, & Wolf, 2012). This effect implies that poststress negative affect inversely relates to cortisol levels during a stressor. Het et al. (2012) suggest that a pronounced cortisol response may help to cope with negative affect and thus leads to an attenuated negative affect after the end of the stressor. Thus, it is possible that high habitual reappraisers who were asked to reappraise reported lower levels of stress after the conflict because of an effective use of this strategy. In contrast, the other groups reported lower levels of stress after the end of

[2]The reason for the stress-buffering effect of reappraisal instructions for high habitual reappraisers may be that they were the ones who engaged in reappraisal the strongest. Yet, note that even though high habitual reappraisers in the reappraisal condition reported using reappraisal more intensively than low and high habitual reappraisers in all other conditions, the overall use of reappraisal was high throughout conditions. Thus, all participants reported that they have reframed the meaning of the event to a certain degree, probably as a means to protect the self (which has been severely attacked by the interaction partner during the conflict task).

the conflict because by that time the mood-buffering cortisol effect had set in. To avoid discrepancies between physiological and self-reported measures of stress, Campbell and Ehlert (2012) suggest using repeated real-time evaluations of subjective stress. However, in the framework of a realistic interpersonal conflict situation, real-time stress evaluations would have been disruptive to the development of the conflict.

4.2 | Content of the reappraisal instructions

It is important to keep in mind that research on the effects of reappraisal instructions during passive viewing tasks demonstrated the effectiveness of this strategy (Webb et al., 2012). Yet, simple instructions fail during a complex social interaction for those not already familiar with reappraisal. We suggest that this is due to the additional cognitive effort that is required to adequately reframe the underlying emotional meaning of the complex interpersonal situation. Yet, this is not the only way to instruct people to reappraise. Specifically, participants who first learn about the functionality of physiological arousal and then are told to appraise their arousal as adaptive instead of maladaptive generally profit from reappraisal instructions within stressful social situations. Even though no differences in subjective stress emerged, instructed arousal reappraisal was found to improve cardiovascular functioning (indexed by greater cardiac output and lower vascular resistance) compared to the use of no or other instructions, probably because it raised the level of perceived resources and hence lowered the appraisal of the stressor as a threat (Jamieson, Nock, & Mendes, 2012). These benefits of arousal reappraisal also extend to socially anxious individuals: Jamieson, Nock, and Mendes (2013) could replicate the adaptive physiological pattern of arousal reappraisal for a sample consisting of both individuals with and without social anxiety disorder. It would be interesting to assess the interaction of instructed and habitual arousal reappraisal. If this form of reappraisal is less distracting for novice users, it may be a useful strategy for ad hoc use.

4.3 | Strengths and limitations

To the best of our knowledge, the present study is the first that investigated the interaction between emotion regulation instructions and habitual emotion regulation strategies on stress during an interpersonal conflict. Yet, this study has also some limitations. First, cortisol was measured only once before and once after the conflict. Due to the variation in salivary cortisol peak time between individuals (Dickerson & Kemeny, 2004; Foley & Kirschbaum, 2010), it would have been more desirable to measure poststressor cortisol more than once to make sure to capture the peak for all participants.

Also, while we could show that reappraisal instructions helped high habitual reappraisers to better cope with stress during the acute interpersonal conflict, it remains to be seen whether the observed stress-buffering effect of reappraisal also helps with regard to the eventual resolution of the interpersonal conflict. When reappraising a situation, people try to change perspectives and try to be more objective and less emotional (Gross, 1998). On the one hand, this behavior may increase empathy for a counterpart, as one strives to understand others' intentions as well as the reasons for their actions (e.g., Batson et al., 1997, used perspective taking to manipulate the level of empathy toward others). This notion seems supported by the postexperimental assessment of the interaction. Under reappraisal instructions, high habitual reappraisers considered their interaction partners to be more competent and reported higher relationship quality.

On the other hand, it is also possible that in some situations a more objective stance also means distancing oneself from the problematic issue, which in consequence interferes with the problem-solving process (Folkman, 2013). Detaching from an emotionally arousing situation may even further decrease mutual liking and cooperation, as interaction partners may perceive this rational and distant behavior as even more provoking and irritating. Notably, mutual liking and perceived friendliness of the interaction partner was not increased in high habitual reappraisers who received reappraisal instructions (but also not decreased). Future research should consider measures of conflict outcomes (such as conflict handling styles) as well as reports of interaction quality collected by all conflict parties to round out this picture.

4.4 | Conclusions

A number of laboratory studies have investigated the effect of instructed reappraisal on well-being during unpleasant social and nonsocial situations. Whereas studies examining nonsocial stressors found consistent positive effects of instructed reappraisal on different kinds of stress indices, studies investigating social stressors revealed inconsistent effects of instructed reappraisal on stress. We investigated whether habitual emotion regulation strategies act as a moderator on the relationship between emotion regulation instructions and social stress during an interpersonal conflict. In accordance with our assumptions, we found that the effect of emotion regulation instructions was moderated by individuals' habitual strategies and acquired competencies. These findings underline the demanding nature of emotion regulation and the adverse effects of unsuccessful emotion regulation attempts in an already demanding socially stressful situation, when the emotion regulation strategy used has not been previously acquired.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

Appendix S1

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Reappraisal and Conflicts–Supplemental Material

This appendix provides supplementary material for the manuscript *Only reappraisers profit from reappraisal instructions: Effects of instructed and habitual reappraisal on stress responses during interpersonal conflicts* by Heidi Mauersberger, Annekatrin Hoppe, Gudrun Brockmann and Ursula Hess.

Detailed Description of the Conflict Task

Stimulus material. For the video recordings of the simulated interaction partner, actors were filmed in a laboratory room resembling the one the experiment took place in. Four actors (two men, two women) were provided with instructions regarding the text and the attitude to be conveyed and filmed. The renditions that corresponded best to the instructions were retained. A computer program selected the video statements according to the sex of the participant and the response options chosen by the participant.

Exemplary illustration of the conflict task.

Sample options for the first discussion point. After participants and simulated interaction partners agreed to discuss improvements of the organizational family-friendliness, participants had to decide which of the following options they preferred: 1) the implementation of home office and flexible working hours, 2) the implementation of a company childcare or 3) the conversion of one full-time position into two part-time positions.

Sample transcript of simulated interaction partners' possible responses to participants' first statements for the first discussion point. *If participants chose the first option (home office and flexible working hours), the simulated interaction partners would argue against this option using the following arguments:* "Sorry, but I don't see any advantages of this option. Home office and flexible working hours are a poor option, as… you have to imagine the coordinating expenses that would be needed to make this work. It would be extremely demanding to manage this… with all the infrastructure, an office at home and at the company with all necessary equipment... I mean so that everyone can work everywhere at every time…You don't want to haul the stuff from one place to the other all of the time. (… But on the other hand, if you have two computers, for example, you may have duplicates of certain documents and will easily loose track of the most recent versions.) No I don't believe this would work. It's too complicated… and I also believe that if you are at home and you are employee and parent at the same time, one task will inevitably suffer. Either you do not work efficiently and precisely … or you feel like a bad parent, I mean, as you are not able to give your full attention to your child's requests. And flexible working hours… how should this be possible if one's work depends on the work of another and their working times do not match at all? Sorry, but this is no option for me at all."

Validation of the conflict task. Independent sample t-tests against zero with data from a subsample from Mauersberger, Hess and Hoppe (2018) who experienced the same emotionally arousing conflict used in the present study confirmed that the scenario elicited an

emotional conflict in almost all participants,[1] M = 99%, $t(70) = 123$, $p < .001$, Cohen's d = 14.7, $CI_{95\%}$ = [97%, 100%], which significantly increased negative affect, $M = 1.10$, $t(69) = 5.73$, $p < .001$, Cohen's $d = 0.68$, $CI_{95\%}$ = [0.72, 1.49], as well as physiological stress indexed by a rise in heart rate, $M = 6.76$, $t(62) = 7.20$, $p < .001$, Cohen's $d = 0.91$, $CI_{95\%}$ = [4.88, 8.63], and a drop in heart rate variability, $M = -.13$, $t(62) = -2.19$, $p = .032$, Cohen's $d = -0.29$, $CI_{95\%}$ = [-.24, -.01], immediately after the climax of the conflict in comparison to a baseline measurement prior to the conflict. These data suggest that the conflict task is a social stress test. None of the participants from the subsample described above took part in the present study.

Additional Analyses

Habitual eating in response to interpersonal stress as moderator. Whether individuals consume snacks in response to a stressful situation depends on individual characteristics of a person. Stress either leads to increases in appetite and the amount of food eaten or alternatively to a loss of appetite and weight (e.g., Kandiah, Yake, Jones, & Meyer, 2006). Whereas some individuals report snacking more, others report snacking less in response to stress (stress hyper- and hypophagics, respectively; Oliver & Wardle, 1999). Those idiosyncrasies should therefore predict the amount of snack food intake under (social) stress (Sproesser et al., 2014).

Habitual eating in response to interpersonal stress qualifies the relationship between food consumption and other indices of stress. Across all participants, the four indices of stress were not highly correlated (see Table A). Especially food intake did neither significantly correlate with self-reported stress reactivity nor with cortisol reactivity. Hence, we also examined whether eating in response to interpersonal stress (see Zellner et al., 2006) acts as a moderator of the relationship between food intake and the other stress indices. Indeed, eating in response to interpersonal stress moderated the relationship between IBI reactivity and food intake: $\beta = -.25$, $p = .003$. Probing the interaction effect following Aiken and West's (1991) instructions revealed that for participants who reported to eat more (here and in the following, "more" refers to scores 1 *SD* above the mean) or who reported to not change their eating style in response to interpersonal stress, IBI reactivity was significantly negatively related to food intake (simple slope $z = -.46$ (.12), $t = -3.93$, $p < .001$ and simple

[1] An adapted German version of Jehn's (1995) conflict scale by Lehmann-Willenbrock, Grohmann and Kauffeld (2011) was used to measure conflict perception. Specifically, we asked for the presence (and intensity) of (task and) emotional conflicts after participants had experienced the conflict scenario.

slope z = -.21 (.06), t = -3.50, p < .001). This was not the case for participants who reported to eat less (here and in the following, "less" refers to scores 1 *SD* below the mean) in response to interpersonal stress. Similarly, eating in response to interpersonal stress moderated the relationship between cortisol reactivity and food intake: β = .25, p = .025. For participants who reported to eat less in response to interpersonal stress, cortisol reactivity was significantly negatively related to food intake (simple slope z = -.27 (.13), t = -2.03, p = .044), whereas the relationship reversed for participants who reported to overeat in response to interpersonal stress: A marginal positive relationship between cortisol reactivity and food intake could be found (simple slope z = .24 (.14), t = 1.71, p = .089). No such effects could be found for self-reported stress reactivity.

Habitual eating in response to interpersonal stress qualifies the interaction between condition and habitual emotion regulation strategies. As mentioned above, physiological stress reactivity (reflected by higher cortisol reactivity and smaller IBI difference scores) only related positively to food intake in stress hyperphagics and not in stress hypophagics. Thus, we conducted exploratory analyses to assess whether the combination of an individual's habitual emotion regulation strategy and their habitual tendency to eat in response to interpersonal stress actually predicts the amount of food eaten under social stress when given specific emotion regulation instructions.

For this, we examined whether the habitual tendency to eat in response to interpersonal stress acts as a moderator of the interaction between reappraisal condition and habitual reappraisal in the analysis with food intake as outcome variable. Besides significant main effects of habitual suppression (β = .14, p = .044) and habitual eating in response to interpersonal stress (β = .19, p = .033) on food intake, the analysis revealed a significant main effect of the reappraisal condition contrast on food intake (β = -.34, p = .041) and a significant interaction between the reappraisal condition contrast and habitual reappraisal (β = -.33, p = .023), which, however, were further qualified by the expected significant three-way interaction between the reappraisal condition contrast, habitual reappraisal and habitual eating in response to interpersonal stress: β = -.73, p < .001. This three-way interaction indicates that the direction of the two-way interaction between the reappraisal condition contrast and habitual reappraisal depends on whether individuals use food as a stress-coping strategy or not. Indeed, whereas for individuals who reported to eat more in response to interpersonal stress, the reappraisal condition contrast by habitual reappraisal interaction term

was significant and negative (β = -1.08, p < .001), for individuals who reported to eat less in response to interpersonal stress, the interaction term was significant and positive (β = .40, p = .033). Simple slope analyses revealed that high habitual reappraisers who reported to eat more in response to interpersonal stress ate significantly less in the reappraisal condition compared to the other two conditions (simple slope z = -1.44 (.30), t = -4.79, p < .001) and low habitual reappraisers who reported to eat less in response to interpersonal stress ate significantly less in the reappraisal condition compared to the other two conditions (simple slope z = -.70 (.29), t = -2.41, p = .017). (Albeit not significant, opposite effects could be observed for low habitual reappraisers who reported to eat more in response to interpersonal stress and for high habitual reappraisers who reported to eat less in response to interpersonal stress.) Additionally, when condition instead of habitual reappraisal was used as (primary) moderator, we found that participants who reported to eat more in response to interpersonal stress ate significantly less (simple slope z = -.62 (.21), t = -2.96, p = .004) in the reappraisal condition with increasing levels of habitual reappraisal and ate significantly more (simple slope z = .45 (.17), t = 2.62, p = .010) in the other two conditions with increasing levels of habitual reappraisal. Further, participants who reported to eat less in response to interpersonal stress ate significantly more (simple z = .40 (.14), t = 2.78, p = .006) in the reappraisal condition with increasing levels of habitual reappraisal. No such effects could be found in the other two conditions.

Similar but inverse results were found when we then added the habitual tendency to eat in response to interpersonal stress as a moderator of the interaction between suppression condition and habitual suppression in the analysis with food intake as outcome variable. Besides the significant main effects of habitual suppression (β = .17, p = .009) and habitual eating in response to interpersonal stress (β = .17, p = .034) on food intake, this analysis revealed a significant interaction between habitual suppression and habitual eating in response to interpersonal stress (β = .34, p < .001) as well as a significant three-way interaction between the suppression condition contrast, habitual suppression and habitual eating in response to interpersonal stress: β = .30, p = .027. For individuals who reported to eat less in response to interpersonal stress, the suppression condition contrast by habitual suppression interaction term was significant and negative (β = -.50 p = .003). In contrast, for individuals who reported to eat more in response to interpersonal stress, this interaction term was positive but nonsignificant. Simple slope analyses indicated that high habitual suppressors who

reported to eat less in response to interpersonal stress actually ate significantly less in the suppression condition compared to the other two conditions (simple slope z = -.73 (.28), t = -2.64, p = .009). This was not the case for low or high habitual suppressors who reported to eat more in response to interpersonal stress or for low habitual suppressors who reported to eat less in response to interpersonal stress. Further, when condition instead of habitual suppression was used as (primary) moderator, results revealed that participants who reported to eat less in response to interpersonal stress ate significantly less (simple z = -.50 (.10), t = -4.88, p < .001) in the suppression condition (but not in the other two conditions) with increasing levels of habitual suppression. Additionally, participants who reported to eat more in response to interpersonal stress ate significantly more in the suppression condition (simple slope z = .57 (.15), t = 3.73, p < .001) and in the other two conditions (simple slope z = .47 (.12), t = 3.81, p < .001) with increasing levels of habitual suppression. The latter two significant simple slopes reflect the significant interaction between habitual suppression and habitual eating in response to interpersonal stress. That is, habitual suppression only increased food intake for stress hyperphagics.

Thus, including habitual eating behaviors completed the picture of the effects of the interplay between instructed and habitual reappraisal on behavioral markers of stress (i.e., amount of snack food intake): Both stress hyperphagics and stress hypophagics profited from the positive effects of reappraisal instructions when they described themselves additionally as high habitual reappraisers (that is, stress hyperphagics ate relatively little or not at all and stress hypophagics ate relatively much under social-evaluative threat). In contrast, stress hyperphagics ate relatively much under reappraisal instructions when they described themselves additionally as low habitual reappraisers and stress hypophagics ate relatively little or not at all under suppression or no instructions when they described themselves additionally as high habitual reappraisers. Opposite effects were obtained for suppression: Even though stress hyperphagics tended to eat a lot during a social stressor, especially if they additionally described themselves as high habitual suppressors, stress hypophagics actually ate relatively little or not at all under suppression instructions if they additionally described themselves as high habitual suppressors. Hence, for stress hypophagics, a negative interplay between suppression instructions and habitual suppression on behavioral markers of stress (i.e., amount of snack food intake) was found.

Amount of food and eating versus noneating. To investigate whether high habitual reappraisers who got instructions to reappraise ate less when they began to eat or simply did

not start to eat (or both), we conducted two further analyses. First, we performed a multiple regression analysis with only those participants who began to eat (n = 82) and examined whether condition, habitual emotion regulation strategy and their respective interactions predicted the amount of food intake in those participants. Unlike the original analyses, we did not find a significant main effect of habitual suppression on food intake. However, we still found a marginal significant reappraisal condition contrast by habitual reappraisal interaction, β = -.47, p = .057, which is similar in magnitude to the original interaction term (albeit not significant due to reduced power). Simple slope analyses indicated high habitual reappraisers ate significantly less (simple slope z = -.87 (.32), t = -2.71, p = .008) in the reappraisal condition compared to the other two conditions. No other significant effects emerged.

Second, we examined in a logistic regression analysis whether condition, habitual emotion regulation strategy and their respective interactions predicted eating status (eating versus noneating). Similar to the findings in the original analyses, a significant reappraisal condition contrast by habitual reappraisal interaction emerged, β = -.94, p = .035. Simple slope analyses revealed that high habitual reappraisers were significantly less likely to start to eat (simple slope z = -1.38 (.61), t = -2.27, p = .023) in the reappraisal condition compared to the other two conditions. This was not the case for low habitual reappraisers. Further, when condition was used as moderator, we found that participants were significantly less likely to start to eat (simple slope z = -.79 (.38), t = -2.09, p = .036), in the reappraisal condition with increasing levels of habitual reappraisal. No significant effects could be found in the other two conditions. In sum, high habitual reappraisers both consumed less food (given that they began to eat) and were less likely to start to eat when instructed to reappraise than when instructed to suppress or not instructed at all. Further, when instructed to reappraise, high habitual reappraisers were less likely to start to eat than low habitual reappraisers.

General control analyses. First, we verified whether the reappraisal condition contrast by habitual reappraisal interaction term would remain significant when sex, age, BMI (weight in kg/height^2 in m^2), hours awake and smoking were included as control variables in the analyses with IBI and cortisol reactivity as outcome variables. The results showed that the interaction term remained significant for both variables (IBI reactivity: β = .37, p = .031; cortisol reactivity: β = -.51, p = .003). In addition, similar to the original analysis, we found a significant main effect of habitual suppression on IBI reactivity (β = -.25, p = .006). Further, a significant main effect of sex and hours awake on cortisol reactivity emerged: On average, women reacted with a significant smaller cortisol increase to the stressor than men: β = -.38,

p = .013 and the longer individuals were awake at the time of the experiment, the significantly higher was their cortisol reactivity: β = .36, p < .001. Then, we conducted further analyses adding menstrual cycle phase and use of oral contraceptives as control variables for female participants (n = 92) in the analyses with IBI and cortisol reactivity as outcome variables. Here again, the interaction term stayed significant for both IBI reactivity: β = .57, p = .016, and cortisol reactivity: β = -.56, p = .013. Additionally, similar to the original analysis, we found a significant main effect of habitual suppression on IBI reactivity (β = -.20, p = .049). Further, a significant main effect of oral contraceptives on cortisol reactivity emerged: Women taking oral contraceptives exhibited significantly less cortisol reactivity than women not taking oral contraceptives: β = -.50, p = .014. This is congruent with findings that sex differences in cortisol reactivity can be explained by the change of women's cortisol level throughout their menstrual cycle and women using oral contraceptives generally show lower cortisol responsiveness to psychological stress than women not using oral contraceptives (Foley & Kirschbaum, 2010; Kirschbaum et al., 1999). These effects could not be found for cardiovascular measures (Kirschbaum et al., 1999).

Further, we also assessed the impact of sex, age, BMI, smoking and habitual eating behaviors in the analyses with food intake as outcome variable. Even though the habitual tendency to eat in response to interpersonal stress significantly predicted food intake (β = .25, p = .039, replicating findings by e.g., Sproesser et al., 2014), the reappraisal condition contrast by habitual reappraisal interaction term remained a significant predictor of food intake (β = -.49, p = .012).

Separate models for reappraisal and suppression. We rerun our main analyses to assess whether results change when we run separate models for reappraisal and suppression on each of the four indices of stress. That is, self-reported stress reactivity, IBI reactivity, cortisol reactivity and food intake was regressed on the reappraisal condition contrast, the suppression condition contrast, and habitual reappraisal (Step 1) as well as on the interaction between the reappraisal condition contrast and habitual reappraisal (Step 2). Here, similar to the original analyses, a significant reappraisal condition contrast by habitual reappraisal interaction emerged for IBI reactivity (β = .46, p = .015), cortisol reactivity (β = -.65, p < .001), and food intake (β = -.53, p = .010).

Further, self-reported stress reactivity, IBI reactivity, cortisol reactivity and food intake was regressed on the reappraisal condition contrast, the suppression condition contrast

and habitual suppression (Step 1) as well as on the interaction between the suppression condition contrast and habitual suppression (Step 2). Here again, similar to the original analyses, we found significant main effects of habitual suppression on IBI reactivity (β = -.26, p = .008) and on food intake (β = .20, p = .015) but the suppression condition contrast by habitual suppression interaction terms remained nonsignificant throughout the analyses (ps > .329).

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Table A

Correlations Between the Four Indices of Stress

	1	2	3
1. Stress reactivity			
2. IBI reactivity	-.20*		
3. Cortisol reactivity	-.03	-.23**	
4. Food intake	.10	-.19*	.003

Note. IBI = Inter-beat-interval. *$p < .05$. **$p < .01$.

Appendix D: Eidesstattliche Erklärung

Hiermit erkläre ich an Eides statt,

1) dass ich die vorliegende Arbeit selbständig und ohne unerlaubte Hilfe verfasst habe,

2) dass ich mich nicht anderwärts um einen Doktorgrad beworben habe und noch keinen Doktorgrad der Psychologie besitze,

3) dass mir die zugrunde liegende Promotionsordnung vom 3. August 2006 bekannt ist.

Berlin, 25.07.2019

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